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 gttccaggct gtcttgatt acaagcaggg tcaagcggag agtggctcaa ttggcaatgc 32520
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 aatatggctg ctgagcaccc ggcaccgtgg atgcataaga gagctttct cggtttgcct 34080
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atc

34203

<210> 3
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<221> misc_feature
<223> Description of Artificial Sequence: A mixed primer which has a DNA sequence deduced from the amino acid sequence of PKS of Aspergillus flavus.

<220>
<221> modified_base
<222> (6)..(6)
<223> i

<220>
<221> modified_base
<222> (9)..(9)
<223> i

<400> 3
gayacngcnt gyasttc

17

<210> 4
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<221> misc_feature
<223> Description of Artificial Sequence: A mixed primer which has a DNA sequence deduced from the amino acid sequence of PKS of Aspergillus flavus.

<220>
<221> modified_base
<222> (3)..(3)
<223> i

<220>
<221> modified_base
<222> (6)..(6)
<223> i

<220>
<221> modified_base
<222> (8)..(8)
<223> i

<220>
<221> modified_base
<222> (15)..(15)
<223> i

<400> 4
tcnccnknrc wgtgncc

17

<210> 5
<211> 19
<212> DNA
<213> Penicillium citrinum

<400> 5
gcatgttcaa tttgctc

19

<210> 6
<211> 19
<212> DNA
<213> Penicillium citrinum

<400> 6
ctggatcaga cttttctgc

19

<210> 7
<211> 18
<212> DNA
<213> Penicillium citrinum

<400> 7
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18

<210> 8
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 8
gtcagagtga tgctcttctc

20

<210> 9
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 9
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20

<210> 10
<211> 19
<212> DNA
<213> Penicillium citrinum

<400> 10
ttgcttgtgt tggattgtc

19

<210> 11
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 11
catggtaactc tcgccccgttc

20

<210> 12
<211> 19
<212> DNA

<213> Penicillium citrinum

<400> 12

ctccccagta cgtaagctc

19

<210> 13

<211> 21

<212> DNA

<213> Penicillium citrinum

<400> 13

ccataatgag tgtgactgtt c

21

<210> 14

<211> 19

<212> DNA

<213> Penicillium citrinum

<400> 14

gaacatctgc atccccgtc

19

<210> 15

<211> 20

<212> DNA

<213> Penicillium citrinum

<400> 15

ggaaggcaaa gaaagtgtac

20

<210> 16

<211> 21

<212> DNA

<213> Penicillium citrinum

<400> 16

agattcattg ctgttggcat c

21

<210> 17

<211> 722

<212> DNA

<213> Penicillium citrinum

<400> 17

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60

aactctgcga ttctgtttaa tcccaatcct atcgcccaa aacaggatca gcagttatgg

120

atcaagccaa ctatccaaac gagccaattg tggttagtggg aagcggttgt cggtttccag

180

gtggtgtcaa cacaccatca aaactttggg agctgctcaa agagccccgg gatgtacaga

240

ccaagatccc taaggagaga tttgacgtcg atacattta cagcccccgt ggcactcacc

300

ccgggcgcac gaacgcaccc tttgcatact tgctgcagga ggatctacgc ggttttgatg

360

cctctttctt caacatccaa gctggagagg ccgaaaacgt tgacccacag caaaggctgc

420

tgctggagac ggtctatgaa gctgtatcca acgcaggcct acggatccaa ggccttcaag

480

gatcctctac tgctgtgtac gtgggttatga tgacgcattga ctatgagact atcgtgacgc

540

gtgaatttggaa tagtattcct acataactctg ccacgggggt agctgtcagt gtggcctcca

600

accgtgtatc atacttcttc gactggcatg ggccgagttt gacgatcgac acagcctgta

660

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tg	722

<210> 18
<211> 760
<212> DNA
<213> Penicillium citrinum

<400> 18	
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aaccgcaacc gcaaccgcaa ccgcaaccgc aaccgcaatg gcaggctcgg cttgctcaa	180
cacatccacg cccattgcca tagttggaaat gggatgtcga tttgctggag atgcaacgag	240
tccacagaag ctttggaaa tgggtgaaag aggaggcagt gcctggctta aggtcccc	300
ctcgcgattc aatgtgagag gagtatacca cccgaatggc gaaagggtcg ggtccaccca	360
cgtaaagggt ggacacttca tcgacgagga tcctgctta tttgacgccc cgttttcaa	420
catgaccaca gaggtcgcca gctgcatgga tccgcagtat cggcttatgc ttgaggtgg	480
ctacgaatcg ctggagagtg ccggatcac catcgatggt atggcaggct ctaatacg	540
ggtgtttggg ggtgtcatgt accacgacta tcaggattcg ctcaatcgat accccgagac	600
agttccgcgt tatttcataa ctggcaactc aggaacaatg ctttcgaacc ggatatcaca	660
cttctacgac ttacgtggtc ccagcgtgac ggttgacacg gcctgttca cgcacattgac	720
cgcactgcac ttggcgtgcc agagcttacg tactggggag	760

<210> 19
<211> 773
<212> DNA
<213> Penicillium citrinum

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cagcgctctc attcttcgct ctttcttctt ttccactgggt gtgcataagggt cctatctgtc	180
tcacgcaatg ctccggcagg ttcttctgac cgtcgaatcg taccaatggg tatcgacccc	240
tcaaggccctt gtggcggtcg cagtgcctt tagtctcatc gcctaccgtt tgccggggcg	300
ccagtccgaa ctgcaagtct ataatccaa aaaatggtgg gagttgacga ccatgagggc	360
taggcaggac ttgcatacgt atggccgag ctggatcgaa gcttgggtt cggaaaaacga	420
caagccccctg cgcttcattt tgattccgg ctattgcacc atccctccat cgtccatggc	480
cgcacgagttt cggaaaaatca aagatatgtg catgtacaag tttttggcgg atgactttca	540
ctctcatctc cctggattcg acgggttcaa ggaaatctgc caggatgcac atcttgc	600
caaagttgtt ttgaaccagt tacaaaccca agcccccaag tacacaaagc cattggctac	660
cttggccgac gctactattg ccaagttgtt cggtaaaagc gaggagtgcc aaaccgcacc	720
tgtctattcc aatggattgg accttgcac acgaacagtc acactcatta tgg	773

<210> 20		
<211> 527		
<212> DNA		
<213> Penicillium citrinum		
<400> 20		
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aaccgattag gttgctcatt cgattttgga gagactacct agctataggc accactccaa	180	
gctgtagcac agacctttca gcatggtcgc ttctgtgcta ccctctcgct ttctcggtag	240	
ggaatcaatg aatcagcagc accctctacg ctggggaaat cgggcattga cctccacact	300	
ccaatttcta tccaaaacgg cgtgtctaca cccgatccat accgtttgca ccatacgat	360	
tctagctagt accacatacg ttggactact caaagacagc ttcttccatg gccccgcaaa	420	
cgttgataaa gcagaatggg gctcttttgt cgaaggaagt cgaagcttga tcaccggccc	480	
acagaatggc tggaagtggc agagcttgcg cggggatgca gatgttc	527	
<210> 21		
<211> 522		
<212> DNA		
<213> Penicillium citrinum		
<400> 21		
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actatagaag cgccgcgcag tagagattca caccggccct tgaagcaaaa gtcggaagga	180	
attgcgcgt gtcagaacct ctacccccta aagaagggg accaaggcca cagaaggaag	240	
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agctcggtct ggtgggtgt tcagttactt tcgttagcatt tttgatgctc cttgatatgt	360	
ccattatcgt cacggcaatc ccacatatca caagcgagtt ccactctctg aacgatgtag	420	
ggtgttacgg cagtgtttat cttctggcta actgtgtctc ccagccccctg gccggtaaat	480	
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<210> 22		
<211> 541		
<212> DNA		
<213> Penicillium citrinum		
<400> 22		
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acgctcatgt gaccgggtgtc atgcacaaaa gctcaaattgt accggtagca atgccaattt	180	
agtccgtgtc cagtgtcaac gttgtcagca agccggatta aggtgtgtgt acagcgaaag	240	
gctacccaag cgcaatttac ataaagaagc cgcaatggc actacaagag ccacagaaac	300	
ctcacaacccg atgaccgcga catcttctac ggtcttctca tcattggcag agactcctcc	360	
accttactgc tcaccaccta cgcatattgg cacctcgca ctcaaggaaa cattatcaga	420	

accatcagcg gcaaccctgc aattctatga tacatcaatc aactttgatg atcccgagtc	480
gttccccggc ggctggcctc agccaaatac atttcgcgac gatgccaaca gcaatgaatc	540
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<210> 23	
<211> 20	
<212> DNA	
<213> Penicillium citrinum	
<400> 23	
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<210> 24	
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<212> DNA	
<213> Penicillium citrinum	
<400> 24	
gctagaatag gttacaagcc	20
<210> 25	
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<212> DNA	
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<400> 25	
acattgccag gcacccagac	20
<210> 26	
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<212> DNA	
<213> Penicillium citrinum	
<400> 26	
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<210> 27	
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gtcttttcct actatctacc	20
<210> 28	
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<212> DNA	
<213> Penicillium citrinum	
<400> 28	
cttccccagc tgctactatc	20
<210> 29	
<211> 1524	
<212> DNA	
<213> Penicillium citrinum	
<400> 29	
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agtaattttg acaaagatac aagacgaatt cgctatttg agatgaatat gcgtgtgtca	120
attgaagccg aattcaggat agatttgcca tctgctctat tgccaaatttc taatccatct	180
ttatcatgaa caacactcaa accacacatc tgaattcacf ggcgtgaacg atctaggcca	240
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gaacactcgt cattttggca ttgccaattt agccactctc cgcttgaccc tgcttgtaat	480
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cctcacgcac actgtcctt gttggctacaa ggtgctcgcc gaatgtctt ctgcccacga	660
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tggtagatcg gttggttcg gcgaggccga tggttatgtc tttgctgccc gtaagacgcg	780
ccaaacaaaac gtggtaggcg gccaggtaga actgcattttt ggttgcctt tgcttgcggc	840
tccgctctt gattcgaag ggcaccatgg gatctaaacg agcaattgtc tcataactgct	900
gccacgtgaa tggctgtatt tgctgctgct ctgaatttgc agcagggtca ttgatcagat	960
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acgcgatatac gtccccattt ccgcattttt ccagggtttt ccgtgttgg acggctagat	1080
cagagaattt ggtcgatggt cgctgcattt tcaccccgct gtaaatctgc ccgatctcat	1140
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ggtaggtcattc tggcccccag tagaaatcaa cgagtctgag agtgcaccc gttggagatgc	1260
tatagtttgc ttctcgagt ttccggtaact cttccctctgc ctccgcagcg ttgttgcaccc	1320
gaacaaagtgc cactctgttc tccgggttct tgagaaccac ttggacggga ccatttaat	1380
cgctgctata gtcatcgcca gtaacaaagc acgtacggaa gatctcgatc cggcgcaatg	1440
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tagtgttggt gaagatggta tgat	1524

<210> 30
 <211> 784
 <212> DNA
 <213> *Penicillium citrinum*

<400> 30	
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ataaaaatagt caggctcagc ccaggctcga ttcagattgg attcaggctt cagaccatgg	180
ccgctatgct ctttcgtact ataccccgat cgagctatac ccgttggcc agacaaaagg	240
tttcactgaa cccttcaact taactgcatt tcgccccaaac taactcgacg aggccggcga	300
tggtagttacc attcatgagc tcaaagatcg acacatcaac atggatttca gatgtgatcc	360
agtttcgaag ttcaatggcg acgagtgagt ctacggcgcac acctggcagg tttttggacg	420

aggacatgtc gtcttctgcc agaccaaaca ttgcgtatcg ctttccgtc attgcttg 480
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 ctggtcctt tttatgcgaa gagacaaagg attggtctgc atgaaggact tggcggatt 600
 taagtcccac aaaccgctgt tcctgtatcc agtttgcctc ggtccagtga gcacccgggg 660
 atgtgttcat tcctgttaacc acagctgcgg gaggtgatgg aaattgaggg gaagaacaca 720
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<210> 31
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 <212> DNA
 <213> Penicillium citrinum

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 attggaataa gcctggggac ggatgcataat ttgttttagt ttgcgtgtta tatcttagca 180
 ccggtcatga gggagcggga tgcctcggtt ggcggcggt accatgagct ttgtggttgg 240
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 caattgagcg gtgaaggcct tgcctggatc ctcgcgcatacg cgcataaaatc ggttagggatc 480
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 caactcgccc ttgggaatga agaggccatt ggatagagtg atgtctctga gagcggta 600
 ggcatacgatg ggcactcga ccggcttgc tgcgtcgatc tctttcatgc agctgtcgag 660
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<210> 32
 <211> 765
 <212> DNA
 <213> Penicillium citrinum

<400> 32
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 ttagatatacc tttctggccg ttcactctac cacctgcctg tctcatttgc ttgtgtttt 180
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 cctgacgggg agacacttcg agaaggggct gaagatgcgg gggcagaacg gttgtgcggc 420
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aaaacagcgc ttccgatgat gcgcgcaagt tgacgtgcat tctcaccggg agtggtcggg	540
tgtgatccgc ggacacccaag catgtcaagc attgcgcctt ggggctccag aatcgatcca	600
ccgccccaaacg ttccaacctc aatagacggc atggagacag agatttgaag cgatccgcga	660
agattgttca tgagagtgat gcagtttagcg ctctccacaa cttgcgcggg atcctgacct	720
gtggcaatga aaatggctgc cgcaagattt gcagcttggg cgttg	765

<210> 33
<211> 802
<212> DNA
<213> *Penicillium citrinum*

<400> 33	
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aacgcggtca agcatcagtc tcagggcacag cccgggtgtc gtttttgggtt gcaatcttcc	180
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ataccagacc tgcgcctatg ggcacggaa cagcgctgcc tagggcccaa ggcaaataatg	660
atccctgtctt tccaattgctg aagccagaaa ccatagccat aatgacttgtt ccaagaattc	720
caggcaacat gtacacacca ctcagtggtt gagaacatc cttcacagcc tggaaagttaga	780
tcggtagata gtagaaaaag ac	802

<210> 34
<211> 562
<212> DNA
<213> *Penicillium citrinum*

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tccctgagggc ctttggcttgc ttgggctt cgtctccggc ttgcgtactc caaaggcacag	180
ataggagacg agaggccggc gttatggttt tattttcagc gccaaggatt tgccacgtat	240
tgcttggcat atctgatagg actagacgaa tagatgccgc agccccgtgc tccttgctt	300
tccccaaggc agtctcaatc ccactcaata gtcgaaggct tacacgcaat gtcgtgcatt	360
cagaagataa ggcgtgcatt aatgggtcga gatgtgaaat gagctcgccg atatgaagat	420
tagagtgaaa cgaggaaatg gtttcggctc ttccattgttccatttgcgatg gttgagccag	480
accagtagca atccatcgatgt gtcattttgtt tttgtccaca aggttggctt ttcattcacct	540

cgatagtag cagctggaa ag

562

<210> 35
<211> 26
<212> DNA
<213> Penicillium citrinum

<400> 35
gttaacatgt cagaacctct accccc

26

<210> 36
<211> 27
<212> DNA
<213> Penicillium citrinum

<400> 36
aatatttcaa gcatcagtct caggcac

27

<210> 37
<211> 1662
<212> DNA
<213> Penicillium citrinum

<220>
<221> CDS
<222> (1)..(1662)

<400> 37
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Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys
1 5 10 15

48

gaa gaa agt caa aat gac acg ctc gaa gcg act gag tcc aag tcc cag
Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln
20 25 30

96

cac atc aca ggc ctc aag ctc ggg ctg gtg gtt gct tca gtt act ttc
His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe
35 40 45

144

gta gca ttt ttg atg ctc ctt gat atg tcc att atc gtc acg gca atc
Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile
50 55 60

192

cca cat atc aca agc gag ttc cac tct ctg aac gat gta ggg tgg tac
Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr
65 70 75 80

240

ggc agt gct tat ctt ctg gct aac tgt gct ctc cag ccc ctg gcc ggt
Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly
85 90 95

288

aaa ttg tat aca ctc ttg ggc ttg aag tac act ttc ttt gcc ttc ctc
Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu
100 105 110

336

tgt att ttt gaa cta ggc tcg gtg cta tgc ggt gcc gca aga tct tcc
Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser
115 120 125

384

acc atg ttg att gtt ggg cgg gcc gtt gct gga atg gga ggc tca ggt
Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly
130 135 140

432

ctt gtc aac gga gcc ctc aca atc ctc tca aca gct gct cct aag cac
Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His

480

145	150	155	160	
aag caa cca gtt ttg att gga gtg atg atg ggt ctt agt cag att gcc Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala 165 170 175				528
att gtc tgt gga cca ctg ctc gga ggt gct ttc act caa cac gcc act Ile Val Cys Gly Pro Leu Leu Gly Ala Phe Thr Gln His Ala Thr 180 185 190				576
tgg cga tgg tgc ttt tat atc aat ctc ccc atc ggc gct gtc gct gca Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala 195 200 205				624
ttc ctc ctt ctc gtc atc acc ata ccc gac cga att tca tcc acg gac Phe Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp 210 215 220				672
agc gaa ctc tcg acc gac aaa cca atg gcc aac ata aaa tcc aca ctt Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu 225 230 235 240				720
cgc aaa ctg gac ctt gta ggc ttt gtg gtc ttt gca gcc ttc gca acc Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr 245 250 255				768
atg att tcc ctc gca cta gaa tgg gga ggg tcg acc tac acc tgg cga Met Ile Ser Leu Ala Leu Glu Trp Gly Ser Thr Tyr Thr Trp Arg 260 265 270				816
agt tcc gtc atc atc ggc ctg ttc tgt ggc gga ggg ttt gct ctg att Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Phe Ala Leu Ile 275 280 285				864
gcg ttc gtg cta tgg gag cgt cat gtt ggc gat gct gtt gcc atg att Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile 290 295 300				912
cct ggc tca gtg gct ggt aaa cga caa gtg tgg tgc tct tgt tta ttt Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe 305 310 315 320				960
atg ggc ttt ttc tct ggc tcc ttg ctt gtc ttt tcc tac tat cta ccg Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro 325 330 335				1008
atc tac ttc cag gct gtg aag gat gtt tct ccc aca cta ctg agt ggt gtg Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val 340 345 350				1056
tac atg ttg cct gga att ctt gga caa gtc att atg gct atg gtt tct Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser 355 360 365				1104
ggc ttc gca att gga aag aca gga tac tat ttg cct tgg gcc cta ggc Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly 370 375 380				1152
agc gct gtt ctc gtc gcc ata ggc gca ggt ctg gta tcc acc ttc cag Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln 385 390 395 400				1200
ccc cat aca tca act gtg aaa tgg gtc atg tac caa ttt atc gcg ggc Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly 405 410 415				1248
ttc ggt cgt ggt tgt ggc atg caa acg cct atc atc gcc atc caa agc Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser 420 425 430				1296

acg ctt tcg ccc gaa caa ggt gcc ctc gga att tct ctc gcc gtg ttt 1344
 Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe
 435 440 445

 gga cag acg ttt gga gga tcg ctc ttc ctg gac ttt gct aac ctt gtc 1392
 Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val
 450 455 460

 ttt ggg tcc ggt ttg aga act ggc ctg agc aag tat gcg ccc act gtc 1440
 Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val
 465 470 475 480

 gac acg cag gcc gtg acg gca gca ggg gcg act ggc ttc aqa gat qtg 1488
 Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val
 485 490 495

 gtc agc aag aat aac ctt cca ggg gtt gta aaa gct tac agt ctc gcc 1536
 Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala
 500 505 510

 gtt gat cat act ttt tac tta gca gtg gga gct acg gcg tgc acg ttt 1584
 Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe
 515 520 525

 gtg ttt gcc ttt gga atg gga tgg cgg aag att gca acc aaa aac gac 1632
 Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp
 530 535 540

 acc cgg gct gtg cct gag act gat gct tga 1662
 Thr Arg Ala Val Pro Glu Thr Asp Ala
 545 550

 <210> 38
 <211> 553
 <212> PRT
 <213> Penicillium citrinum

 <400> 38

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 1 5 10 15

 Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln
 20 25 30

 His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe
 35 40 45

 Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile
 50 55 60

 Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr
 65 70 75 80

 Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly
 85 90 95

 Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu
 100 105 110

 Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser
 115 120 125

Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly
 130 135 140

Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His
 145 150 155 160

Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala
 165 170 175

Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr
 180 185 190

Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala
 195 200 205

Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp
 210 215 220

Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu
 225 230 235 240

Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr
 245 250 255

Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg
 260 265 270

Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Phe Ala Leu Ile
 275 280 285

Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile
 290 295 300

Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe
 305 310 315 320

Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro
 325 330 335

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val
 340 345 350

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser
 355 360 365

Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly
 370 375 380

Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln
 385 390 395 400

Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly
 405 410 415

Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser
 420 425 430

Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe
 435 440 445

Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val
 450 455 460

Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val
 465 470 475 480

Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val
 485 490 495

Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala
 500 505 510

Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe
 515 520 525

Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp
 530 535 540

Thr Arg Ala Val Pro Glu Thr Asp Ala
 545 550

<210> 39
<211> 31
<212> DNA
<213> Penicillium citrinum

<400> 39
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31

<210> 40
<211> 30
<212> DNA
<213> Penicillium citrinum

<400> 40
ggatccctaa gcaatattgt gtttcttcgc

30

<210> 41
<211> 1380
<212> DNA
<213> Penicillium citrinum

<220>
<221> CDS
<222> (1)..(1380)

<400> 41
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Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala

48

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ttt cga cgc tca tgt gac cgg tgt cat gca caa aag ctc aaa tgt acc Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr 20 25 30				96
ggt agc aat gcc aat tta gtc cgt gct cag tgt caa cgt tgt caa caa Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln 35 40 45				144
gcc gga tta agg tgt gtg tac agc gaa agg cta ccc aag cgc aat tta Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu 50 55 60				192
cat aaa gaa gcc gca gct gga act aca aga gcc aca gaa acc tca caa His Lys Glu Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln 65 70 75 80				240
ccg atg acc gcg aca tct tct acg gtc ttc tca tca ttg gca gag act Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr 85 90 95				288
cct cca cct tac tgc tca cca cct acg cat att ggc acc tcg gca ctc Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu 100 105 110				336
aag gaa aca tta tca gaa cca tca gcg gca acc ctg caa ttc tat gat Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp 115 120 125				384
aca tca atc aac ttt gat gat ccc gag tcg ttt ccc ggc ggc tgg cct Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro 130 135 140				432
cag cca aat aca ttt cgc gac gat gcc aac agc aat gaa tct tcg ggg Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly 145 150 155 160				480
ata cca gat cta ggc tac gac ttt gaa ggc cct ttg gat gca acg gcg Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala 165 170 175				528
cct gtc tcg cca tcg ctg ttt gac ctc gaa gta gag ggg aac tcg tca Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Gly Asn Ser Ser 180 185 190				576
tcc gga caa tcc aac aca agc aac acg caa cga gac ctt ttc gaa agt Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser 195 200 205				624
ctg tcg gat gtg tca cag gac cta gag gta ata ctc cac ggg gtg act Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr 210 215 220				672
gtg gaa tgg ccc aag caa aaa att tta agc tac ccg ata ggg gac ttt Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe 225 230 235 240				720
ttg aat gcc ttt ggt aga ttg cta cta cat ctt caa gaa cgt gtg atc Leu Asn Ala Phe Gly Arg Leu Leu His Leu Gln Glu Arg Val Ile 245 250 255				768
acg agc agc aat agc agc atg tta gat ggg tgt ctg caa acc aac aag aac Thr Ser Ser Asn Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn 260 265 270				816
ttg ttc atg gcg gtg cat tgc tac atg ttg tct gtc aaa atc atg aca Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr 275 280 285				864

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gga caa aag caa agc aca cga atg gat tgg tac tgg tct ggc tca acc Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr 305 310 315 320	960
act aga aat gac aat gga aga gcc gaa gca ctt ccc tcg ttt cac tct Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser 325 330 335	1008
aat ctt cat atc ggc gag ctc att tca cat ctc gac cca ttc atg cac Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His 340 345 350	1056
gcc tta tct tct gca tgc acg aca ttg cgt gta agc ctt cga cta ttg Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu 355 360 365	1104
agt gag att gag act gct ttg ggg ata gca cag gag cac ggg gct gcg Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala 370 375 380	1152
gca tct att cgt cta gtc cta tca gat atg cca agc aca tcg tgg caa Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln 385 390 395 400	1200
atc ctt ggc gct gaa aat aaa acc ata acg ccg gcc tct cgt ctc cta Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu 405 410 415	1248
tct gtg ctt tgg agt gac gaa gcc gga gac gaa gag ccc aag tca aca Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr 420 425 430	1296
aag gcc tca ggg aag acg ata aat gtg ttg cga cgt tgc tat aag gaa Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu 435 440 445	1344
ata ttc gca tta gcg aag aaa cac aat att gct tag Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala 450 455	1380
<210> 42	
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<212> PRT	
<213> Penicillium citrinum	
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Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr 20 25 30	
Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln 35 40 45	
Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu 50 55 60	
His Lys Glu Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln 65 70 75 80	

Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr
 85 90 95

Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu
 100 105 110

Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Phe Tyr Asp
 115 120 125

Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro
 130 135 140

Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly
 145 150 155 160

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala
 165 170 175

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser
 180 185 190

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser
 195 200 205

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr
 210 215 220

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe
 225 230 235 240

Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile
 245 250 255

Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn
 260 265 270

Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr
 275 280 285

Ser Leu Ser Gln Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys
 290 295 300

Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr
 305 310 315 320

Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser
 325 330 335

Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His
 340 345 350

Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu
 355 360 365

Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala
 370 375 380

Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln
 385 390 395 400

Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu
 405 410 415

Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr
 420 425 430

Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu
 435 440 445

Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala
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<210> 43
<211> 9099
<212> DNA
<213> Penicillium citrinum

<220>
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1 5 10 15

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Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
20 25 30

ctg ctc aaa gag ccc cgg gat gta cag acc aag atc cct aag gag aga 144
Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
35 40 45

ttt gac gtc gat aca ttt tac agc ccc gat ggc act cac ccc ggg cgc 192
Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
50 55 60

acg aac gca ccc ttt gca tac ttg ctg cag gag gat cta cgc ggt ttt 240
Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
65 70 75 80

gat gcc tct ttc aac atc caa gct gga gag gcc gaa acg att gac 288
Asp Ala Ser Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
85 90 95

cca cag caa agg ctg ctg gag acg gtc tat gaa gct gta tcc aac 336
Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
100 105 110

gca ggc cta cggt atc caa ggc ctt caa gga tcc tct act gct gtg tac 384
Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr
115 120 125

gtc ggt atg atg acg cat gac tat gag act atc gtg acg cgt gaa ttg Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu 130 135 140	432
gat agt att cct aca tac tct gcc acg ggg gta gct gtc agt gtg gcc Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala 145 150 155 160	480
tcc aac cgt gta tca tac ttc ttc gac tgg cat ggg ccg agt atg acg Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr 165 170 175	528
atc gac aca gcc tgt agt tca tcc tta gct gcc gtg cat ctg gcc gtc Ile Asp Thr Ala Cys Ser Ser Leu Ala Ala Val His Leu Ala Val 180 185 190	576
caa cag ctt aga acg ggc gag agt acc atg gcg gtt gca gcc ggt gcg Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala 195 200 205	624
aat ctg ata ttg ggc ccc atg acc ttt gta atg gag agc aaa ttg aac Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn 210 215 220	672
atg ctg tcc ccc aat ggt aga tct cga atg tgg gat gct gct gcc gat Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp 225 230 235 240	720
gga tat gcc aga gga gaa ggt gtt tgc tct att gtc ctg aaa acg ctg Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu 245 250 255	768
agc cag gca ctg cgc gac ggg gac agt atc gag tgt gtt atc cga gag Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu 260 265 270	816
acc ggt atc aac caa gat ggc cga acg aca ggt atc aca atg cca aac Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn 275 280 285	864
cat agc gca caa gaa gcc ctc att cgg gcc aca tat gcc aag gct ggt His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly 290 295 300	912
ctt gat att acc aac ccc cag gaa cgc tgc cag ttc ttt gaa gcc cat Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His 305 310 315 320	960
gga act ggt aca cca gcc ggt gac cca cag gaa gct gag gct att gca Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala 325 330 335	1008
aca gcc ttc ttc gga cac aag gat gga aca atc gac agc gac ggc gag Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu 340 345 350	1056
aaa gat gag ctt ttt gtc ggc agc atc aag aca gtt ctc ggt cac acg Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr 355 360 365	1104
gaa ggc act gct ggt att gcg ggc tta atg aag gca tcg ttt gct gta Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val 370 375 380	1152
cga aat ggc gtg atc ccg cca aac ctg ctg ttt gag aag atc agt ccc Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro 385 390 395 400	1200
cgt gtc gct ccg ttc tat acg cac ttg aaa att gca acg gag gcc aca Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr	1248

405	410	415	
gaa tgg ccg att gtt gcg ccc ggg cag cct cgc aga gtc agc gtt aat Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn 420	425	430	1296
tca ttt gga ttt ggt ggt aca aat gcc cat gct att atc gaa gag tat Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr 435	440	445	1344
atg gct cct cca cac aag ccg aca gca gtg gta aca gag gtg acc tca Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser 450	455	460	1392
gat gca gat gca tgc agc ttg ccc ctt gtg ctt tca tcg aag tcg cag Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln 465	470	475	1440
cgc tcc atg aag gca acg cta gaa aat atg ctc caa ttt ctg gaa acg Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr 485	490	495	1488
cat gat gac gtg gac atg cat gat atc gca tat acc tta ctt gag aaa His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys 500	505	510	1536
cgg tct atc ttg ccc ttc cgt cgt gcg att gca gca cac aac aag gaa Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu 515	520	525	1584
gta gcc cgc gcg gca ctg gag gct gcc atc gcg gac ggt gag gtc gtc Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val 530	535	540	1632
acc gac ttc cgc acc gac gcg aat gac aac cct cgc gta cta ggt gtc Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val 545	550	555	1680
ttt act ggc caa ggt gca cag tgg ccg ggc atg ctg aag aag ctc atg Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met 565	570	575	1728
gtg ggt atg cca ttt gtg aga ggc att ctc gaa gag ctg gat aat tca Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Leu Asp Asn Ser 580	585	590	1776
ctg caa aca ctg cct gaa aag tat cgg cct acg tgg aca ctg tat gac Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp 595	600	605	1824
cag ctc atg ctt gaa ggg gat gcc tca aac gtc aga ctc gcc agc ttc Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe 610	615	620	1872
tcc cag cct cta tgc tgc gcc gta caa atc gtt ctg gtc cga ctt ctc Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu 625	630	635	1920
gct gca gct ggt atc gag ttc agt gca att gtc ggc cac agt tca ggt Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly 645	650	655	1968
gag att gcc tgt gcc ttt gcg gca gga ttc atc agt gcc act caa gct Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala 660	665	670	2016
atc cgt att gcg cat ctg cgt gga gtt gtg tcc gcg gag cat gcc tct Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser 675	680	685	2064

tct cca agc ggc cag aca ggc gct atg cta gcg gca ggt atg tcg tac Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr 690 695 700	2112
gat gac gca aag gaa cta tgc gag ctc gaa gcc ttt gag ggt cgg gtc Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val 705 710 715 720	2160
tgc gtc gcc gct agc aat tca ccg gat agt gtg acc ttc tcc ggc gac Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp 725 730 735	2208
atg gat gct atc cag cac gtt gaa ggt gtc ttg gag gat gaa tcc act Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr 740 745 750	2256
ttt gcc aga atc ttg aga gtt gac aag gcc tac cat tcg cat cac atg Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met 755 760 765	2304
cac cca tgc gca gct cca tat gtc aag gca ttg ctg gag tgc gac tgt His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys 770 775 780	2352
gct gtt gcc gat ggc caa ggt aac gat agt gtt gct tgg ttc tct gcc Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala 785 790 795 800	2400
gtc cac gag acc agc aag caa atg act gta cag gat gtg atg ccc gct Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala 805 810 815	2448
tat tgg aaa gac aat ctc gtc tct ccg gtc ttg ttc tcg cag gct gtg Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val 820 825 830	2496
cag aaa gca gtc atc act cat cgt cta atc gac gtc gcc atc gaa att Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile 835 840 845	2544
ggc gcc cac cct gct ctc aag ggt ccg tgt cta gcc acc atc aag gat Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp 850 855 860	2592
gct ctt gcc ggt gtg gag ctg ccg tat acc ggg tgc ttg gca cga aac Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn 865 870 875 880	2640
gtt gac gat gtg gac gct ttt gct gga ggt ctg gga tac att tgg gag Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu 885 890 895	2688
cgt ttc gga gtt cgg agt atc gac gcc gag ggc ttc gta caa caa gtc Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val 900 905 910	2736
cgg ccc gat cgt gcc gtt caa aac ctg tca aag tca ttg ccc aca tac Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr 915 920 925	2784
tct tgg gat cat act cgt caa tac tgg gca gaa tct cgc tcc acc cgc Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg 930 935 940	2832
cag cat ctt cgt ggaa ggt gcg ccc cat ctt ctg ctt gga aag ctt tct Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Gly Lys Leu Ser 945 950 955 960	2880
tct tac agc aca gca tcg acc ttc cag tgg aca aac ttc atc agg ccc Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro	2928

	965	970	975	
cg gat ctg gaa tgg ctc gac ggt cat gcg cta caa ggc cag act gtg Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val	980	985	990	2976
tcc ccc gct gct ggg tac ata att atg gcc atg gaa gct gcc atg aag Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys	995	1000	1005	3024
gtg gct ggt gag cgt gcc gcc caa gtt cag ctc ctg gaa atc ttg Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu	1010	1015	1020	3069
gac atg agc atc aac aaa gcc atc gtg ttt gaa gat gaa aac acc Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr	1025	1030	1035	3114
tcc gtg gag ctg aac ttg aca gcc gaa gtc acc agt gac aat gat Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp	1040	1045	1050	3159
gcg gat ggc caa gtc acg gtc aaa ttt gtt att gat tcc tgt ctg Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu	1055	1060	1065	3204
gca aag gag agt gag ctt tcg aca tcc gcc aaa ggc caa atc gtc Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val	1070	1075	1080	3249
ata acc ctt ggc gag gca tca ccg tca tcg cag ctt ttg ccg cca Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro	1085	1090	1095	3294
cct gag gaa gag tac ccc cag atg aac aat gtc aac atc gat ttc Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe	1100	1105	1110	3339
tcc tat cgg gaa ctt gac ctc ctt ggg tat gac tac agc aaa gac Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp	1115	1120	1125	3384
tcc cgt cgt ttg cag acc atg aga agg gcc gac tcc aaa gct agc Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser	1130	1135	1140	3429
ggc acc ttg gct ttc ctt cca ctt aag gat gaa ttg cgc aat gag Gly Thr Leu Ala Phe Leu Pro Leu Lys Asp Glu Leu Arg Asn Glu	1145	1150	1155	3474
ccc ctc ttg ctc cac cca gcg ccc ctg gac atc gcg ttc cag act Pro Leu Leu Leu His Pro Ala Pro Leu Asp Ile Ala Phe Gln Thr	1160	1165	1170	3519
gtc att gga gcg tat tcc tct cca gga gat cgt cgc cta cgc tca Val Ile Gly Ala Tyr Ser Ser Pro Gly Asp Arg Arg Leu Arg Ser	1175	1180	1185	3564
ttg tac gtg cct act cac gtt gac aga gtg act ctg att cca tcg Leu Tyr Val Pro Thr His Val Asp Arg Val Thr Leu Ile Pro Ser	1190	1195	1200	3609
ctc tgt ata tcg gcg ggt aat tct ggt gaa acc gag ctt cgc ttt Leu Cys Ile Ser Ala Gly Asn Ser Gly Glu Thr Glu Leu Ala Phe	1205	1210	1215	3654
gac aca atc aac aca cac gac aag ggt gat ttc ctg agc ggc gac Asp Thr Ile Asn Thr His Asp Lys Gly Asp Phe Leu Ser Gly Asp	1220	1225	1230	3699

atc acg	gtg tac gat tcg acc	aag aca acg ctt ttc	caa gtt gat	3744
Ile Thr	Val Tyr Asp Ser Thr	Lys Thr Thr Leu Phe	Gln Val Asp	
1235	1240	1245		
aac att	gtc ttt aag cct ttc	tct ccc ccg act gct	tcg acc gac	3789
Asn Ile	Val Phe Lys Pro Phe	Ser Pro Pro Thr Ala	Ser Thr Asp	
1250	1255	1260		
cac cga	atc ttc gca aag tgg	gtc tgg gga ccc ctc	acg ccc gaa	3834
His Arg	Ile Phe Ala Lys Trp	Val Trp Gly Pro Leu	Thr Pro Glu	
1265	1270	1275		
aaa ctg	ctg gag gac cct gcg	acg ttg atc ata gct	cgg gac aag	3879
Lys Leu	Leu Glu Asp Pro Ala	Thr Leu Ile Ala	Arg Asp Lys	
1280	1285	1290		
gag gac	att ctg acc atc gag	cga atc gtt tac ttc	tac atc aaa	3924
Glu Asp	Ile Leu Thr Ile Glu	Arg Ile Val Tyr Phe	Tyr Ile Lys	
1295	1300	1305		
tcc ttc	cta gcc cag ata acc	ccc gac gac cgt caa	aat gcc gac	3969
Ser Phe	Leu Ala Gln Ile Thr	Pro Asp Asp Arg Gln	Asn Ala Asp	
1310	1315	1320		
ctc cat	tcc cag aag tac att	gaa tgg tgt gac cag	gtt cag gcc	4014
Leu His	Ser Gln Lys Tyr Ile	Glu Trp Cys Asp Gln	Val Gln Ala	
1325	1330	1335		
gat gct	cgg gct ggc cac cat	cag tgg tac cag gag	tct tgg gag	4059
Asp Ala	Arg Ala Gly His His	Gln Trp Tyr Gln Glu	Ser Trp Glu	
1340	1345	1350		
gag gac	act tct gtt cac att	gag caa atg tgt gaa	agc aac tcg	4104
Glu Asp	Thr Ser Val His Ile	Glu Gln Met Cys Glu	Ser Asn Ser	
1355	1360	1365		
tcc cac	cca cat gtg cgc ctg	atc caa agg gta ggc	aaa gaa tta	4149
Ser His	Pro His Val Arg Leu	Ile Gln Arg Val Gly	Lys Glu Leu	
1370	1375	1380		
att tca	att gtt cgc ggg aac	ggg gat cct ttg gat	atc atg aac	4194
Ile Ser	Ile Val Arg Gly Asn	Gly Asp Pro Leu Asp	Ile Met Asn	
1385	1390	1395		
cgc gat	ggg ttg ttc acc gag	tac tat acc aac aag	ctc gcc ttt	4239
Arg Asp	Gly Leu Phe Thr Glu	Tyr Tyr Thr Asn Lys	Leu Ala Phe	
1400	1405	1410		
ggc tca	gca ata cac gtc gtt	cag gat ctg gtt agc	caa att gct	4284
Gly Ser	Ala Ile His Val Val	Gln Asp Leu Val Ser	Gln Ile Ala	
1415	1420	1425		
cat cgc	tac caa tcc att gat	atc ctt gag atc ggc	ttg ggt aca	4329
His Arg	Tyr Gln Ser Ile Asp	Ile Leu Glu Ile Gly	Leu Gly Thr	
1430	1435	1440		
ggc atc	gcc acg aag cgc gtt	ctt gca tca cct caa	ctt ggt ttc	4374
Gly Ile	Ala Thr Lys Arg Val	Leu Ala Ser Pro Gln	Leu Gly Phe	
1445	1450	1455		
aac agt	tac act tgc act gac	atc tcg gcg gat gtt	att ggc aag	4419
Asn Ser	Tyr Thr Cys Thr Asp	Ile Ser Ala Asp Val	Ile Gly Lys	
1460	1465	1470		
gcc cgt	gaa caa ctt tcc gaa	ttc gac ggt ctc atg	cag ttt gag	4464
Ala Arg	Glu Gln Leu Ser Glu	Phe Asp Gly Leu Met	Gln Phe Glu	
1475	1480	1485		
gca cta	gac atc aac aga agc	cca gca gag caa gga	ttc aag cct	4509
Ala Leu	Asp Ile Asn Arg Ser	Pro Ala Glu Gln Gly	Phe Lys Pro	

1490	1495	1500	
cac tcc tac gat ctg att att	gca tcc gat gtc ctc	cat gcc agc	4554
His Ser Tyr Asp Leu Ile Ile	Ala Ser Asp Val Leu	His Ala Ser	
1505	1510	1515	
tcc aac ttc gag gaa aaa ttg	gct cac ata agg tcc	ttg ctc aag	4599
Ser Asn Phe Glu Glu Lys Leu	Ala His Ile Arg Ser	Leu Leu Lys	
1520	1525	1530	
ccg ggt ggt cac ttg gtt act	ttc ggg gtc acc cat	cgc gag cct	4644
Pro Gly Gly His Leu Val Thr	Phe Gly Val Thr His	Arg Glu Pro	
1535	1540	1545	
gct cgc ctc gcc ttc atc tct	ggg ctt ttc gct gat	cga tgg act	4689
Ala Arg Leu Ala Phe Ile Ser	Gly Leu Phe Ala Asp	Arg Trp Thr	
1550	1555	1560	
gga gaa gac gaa act cgt gct	ttg agt gcc tcg ggg	tcc gtt gac	4734
Gly Glu Asp Glu Thr Arg Ala	Leu Ser Ala Ser Gly	Ser Val Asp	
1565	1570	1575	
caa tgg gag cat acc ctc aag	aga gtt ggg ttc tct	ggc gtc gat	4779
Gln Trp Glu His Thr Leu Lys	Arg Val Gly Phe Ser	Gly Val Asp	
1580	1585	1590	
agt cgg aca ctt gat cga gag	gat gat ttg atc ccg	tct gtc ttc	4824
Ser Arg Thr Leu Asp Arg Glu	Asp Asp Leu Ile Pro	Ser Val Phe	
1595	1600	1605	
agt aca cat gct gtg gat gcc	acc gtt gag cgt ttg	tat gat cca	4869
Ser Thr His Ala Val Asp Ala	Thr Val Glu Arg Leu	Tyr Asp Pro	
1610	1615	1620	
ctt tct gct cca ttg aag gac	tca tac ccg cca tta	gtg gtt atc	4914
Leu Ser Ala Pro Leu Lys Asp	Ser Tyr Pro Pro Leu	Val Val Ile	
1625	1630	1635	
ggt ggc gaa tcg aca aaa acc	gaa cgc att ttg aac	gac atg aaa	4959
Gly Gly Glu Ser Thr Lys Thr	Glu Arg Ile Leu Asn	Asp Met Lys	
1640	1645	1650	
gct gcc cta ccg cat aga cac	atc cac tcc gtc aag	cgg ctg gaa	5004
Ala Ala Leu Pro His Arg His	Ile His Ser Val Lys	Arg Leu Glu	
1655	1660	1665	
agt gtt ctc gac gac ccg gcc	ttg cag cct aag tcg	act ttt gtc	5049
Ser Val Leu Asp Asp Pro Ala	Leu Gln Pro Lys Ser	Thr Phe Val	
1670	1675	1680	
atc ctc tcg gaa ctt gat gat	gaa gtg ttt tgc aac	ctt gaa gag	5094
Ile Leu Ser Glu Leu Asp Asp	Glu Val Phe Cys Asn	Leu Glu Glu	
1685	1690	1695	
gac aag ttt gag gca gtc aag	tct ctt ctc ttc tac	gcc gga cgc	5139
Asp Lys Phe Glu Ala Val Lys	Ser Leu Leu Phe Tyr	Ala Gly Arg	
1700	1705	1710	
atg atg tgg ctg aca gag aat	gcc tgg att gat cat	ccc cac cag	5184
Met Met Trp Leu Thr Glu Asn	Ala Trp Ile Asp His	Pro His Gln	
1715	1720	1725	
gcc agc acc atc gga atg ttg	agg aca atc aag ctc	gag aac cct	5229
Ala Ser Thr Ile Gly Met Leu	Arg Thr Ile Lys Leu	Glu Asn Pro	
1730	1735	1740	
gac ttg gga acg cac gtc ttc	gat gtc gat act gtg	gag aac cta	5274
Asp Leu Gly Thr His Val Phe	Asp Val Asp Thr Val	Glu Asn Leu	
1745	1750	1755	

gac acc aaa ttc ttc gtt gag	caa ctt ttg cgc ttc	gag gag agc	5319
Asp Thr Lys Phe Phe Val Glu	Gln Leu Leu Arg Phe	Glu Glu Ser	
1760	1765	1770	
gat gat cag ctt ttg gaa tca	ata aca tgg act cat	gag ccc gaa	5364
Asp Asp Gln Leu Leu Glu Ser	Ile Thr Trp Thr His	Glu Pro Glu	
1775	1780	1785	
gtg tac tgg tgc aag ggt cgt	gcc tgg gtc cct cgt	ttg aag cag	5409
Val Tyr Trp Cys Lys Gly Arg	Ala Trp Val Pro Arg	Leu Lys Gln	
1790	1795	1800	
gat att gct agg aac gac cgt	atg aac tcg tct cgt	cgt cca att	5454
Asp Ile Ala Arg Asn Asp Arg	Met Asn Ser Ser Arg	Arg Pro Ile	
1805	1810	1815	
tcc ggt aac ttt aat tcg tcc	aag acg gcc att gca	ctg aaa gag	5499
Phe Gly Asn Phe Asn Ser Ser	Lys Thr Ala Ile Ala	Leu Lys Glu	
1820	1825	1830	
gcg agg gga gca tcc tca tcg	atg tac tat ctt gag	tca acc gag	5544
Ala Arg Gly Ala Ser Ser Ser	Met Tyr Tyr Leu Glu	Ser Thr Glu	
1835	1840	1845	
acg tgt gat tcg tta gaa gac	gct cgt cat gct gga	aaa gca act	5589
Thr Cys Asp Ser Leu Glu Asp	Ala Arg His Ala Gly	Lys Ala Thr	
1850	1855	1860	
gtt cgt gtt cgc tac gct ctt	ccc cag gca att cgc	gtg ggc cat	5634
Val Arg Val Arg Tyr Ala Leu	Pro Gln Ala Ile Arg	Val Gly His	
1865	1870	1875	
ctc gga tac ttc cat gtc gtg	cag ggc agt att ctg	gag aat aca	5679
Leu Gly Tyr Phe His Val Val	Gln Gly Ser Ile Leu	Glut Asn Thr	
1880	1885	1890	
tgt gag gtg cct gta gtc gcc	ctg gct gag aag aat	gga tct ata	5724
Cys Glu Val Pro Val Val Ala	Leu Ala Glu Lys Asn	Gly Ser Ile	
1895	1900	1905	
ctg cat gta ccg aga aac tac	atg cat agt ctg ccc	gat aac atg	5769
Leu His Val Pro Arg Asn Tyr	Met His Ser Leu Pro	Asp Asn Met	
1910	1915	1920	
gcg gaa ggc gag gat agt tcc	ttc ttg ttg tcc aca	gct gca gcc	5814
Ala Glu Gly Glu Asp Ser Ser	Phe Leu Leu Ser Thr	Ala Ala Ala	
1925	1930	1935	
ctc ctt gcc gaa aca att ctc	tct agc gct cag tcc	ttt ggc tct	5859
Leu Leu Ala Glu Thr Ile Leu	Ser Ser Ala Gln Ser	Phe Gly Ser	
1940	1945	1950	
gat gca tca att ctg att atg	gag ccc cca atc ttc	tgc gtc aaa	5904
Asp Ala Ser Ile Leu Ile Met	Glu Pro Pro Ile Phe	Cys Val Lys	
1955	1960	1965	
gca att ctg gag tcg gcc aaa	acc tac ggt gtt cag	gtt cat ttg	5949
Ala Ile Leu Glu Ser Ala Lys	Thr Tyr Gly Val Gln	Val His Leu	
1970	1975	1980	
gca aca act ctg tcc gac gtc	aaa act att ccg gct	cct tgg atc	5994
Ala Thr Thr Leu Ser Asp Val	Lys Thr Ile Pro Ala	Pro Trp Ile	
1985	1990	1995	
cga tta cat gcc aag gaa acc	gac gct cgg ctg aaa	cac agc ctg	6039
Arg Leu His Ala Lys Glu Thr	Asp Ala Arg Leu Lys	His Ser Leu	
2000	2005	2010	
ccg aca aac atg atg gca ttc	ttt gac ttg tct acc	gac cg act	6084
Pro Thr Asn Met Met Ala Phe	Phe Asp Leu Ser Thr	Asp Arg Thr	

2015

2020

2025

gct	gcc	ggg	ata	acc	aac	cgt	ttg	gcc	aag	ttg	cta	cca	ccc	agt	6129
Ala	Ala	Gly	Ile	Thr	Asn	Arg	Leu	Ala	Lys	Leu	Leu	Pro	Pro	Ser	
2030				2035						2040					
tgc	ttc	atg	tac	agt	ggt	gac	tat	ctt	atc	cga	agt	aca	gct	tcc	6174
Cys	Phe	Met	Tyr	Ser	Gly	Asp	Tyr	Leu	Ile	Arg	Ser	Thr	Ala	Ser	
2045				2050						2055					
aca	tac	aaa	gtt	agt	cat	gtt	gag	gat	att	cca	atc	ctc	gag	cac	6219
Thr	Tyr	Lys	Val	Ser	His	Val	Glu	Asp	Ile	Pro	Ile	Leu	Glu	His	
2060				2065						2070					
tct	gtg	gca	atg	gca	aaa	aat	acc	gtc	tct	gcg	tcg	act	gtc	gac	6264
Ser	Val	Ala	Met	Ala	Lys	Asn	Thr	Val	Ser	Ala	Ser	Thr	Val	Asp	
2075				2080						2085					
gac	act	gag	aaa	gtt	att	aca	gcc	aca	caa	att	ctc	ttg	cct	ggt	6309
Asp	Thr	Glu	Lys	Val	Ile	Thr	Ala	Thr	Gln	Ile	Leu	Leu	Pro	Gly	
2090				2095						2100					
cag	ctc	tct	gtc	aac	cac	aat	gac	caa	cgc	tcc	aat	ctg	gcc	acc	6354
Gln	Leu	Ser	Val	Asn	His	Asn	Asp	Gln	Arg	Phe	Asn	Leu	Ala	Thr	
2105				2110						2115					
gtc	atc	gac	tgg	aag	gaa	aat	gag	gtg	tcc	gct	agg	att	tgc	ccc	6399
Val	Ile	Asp	Asp	Trp	Lys	Glu	Asn	Glu	Val	Ser	Ala	Arg	Ile	Cys	Pro
2120				2125						2130					
atc	gac	tct	ggt	aac	tta	ttt	tcc	aac	aag	aag	acg	tat	ttg	ctt	6444
Ile	Asp	Ser	Gly	Asn	Leu	Phe	Ser	Asn	Lys	Lys	Thr	Tyr	Leu	Leu	
2135				2140						2145					
gtt	ggt	ctt	acc	ggg	gac	ctt	ggt	cgc	tct	ctc	tgt	cgc	tgg	atg	6489
Val	Gly	Leu	Thr	Gly	Asp	Leu	Gly	Arg	Ser	Leu	Cys	Arg	Trp	Met	
2150				2155						2160					
atc	ttg	cat	ggc	gcc	cgc	cat	gtt	gtg	ctc	act	agc	cgg	aac	cct	6534
Ile	Leu	His	Gly	Ala	Arg	His	Val	Val	Leu	Thr	Ser	Arg	Asn	Pro	
2165				2170						2175					
cga	ctt	gat	ccc	aaa	tgg	atc	gcc	aac	atg	gag	gca	ctt	ggt	ggt	6579
Arg	Leu	Asp	Pro	Lys	Trp	Ile	Ala	Asn	Met	Glu	Ala	Leu	Gly	Gly	
2180				2185						2190					
gac	atc	acc	gtt	ctg	tca	atg	gat	gtt	gcc	aat	gag	gat	tca	gtc	6624
Asp	Ile	Thr	Val	Leu	Ser	Met	Asp	Val	Ala	Asn	Glu	Asp	Ser	Val	
2195				2200						2205					
gat	gct	ggc	ctt	ggc	aag	ctt	gtc	gat	atg	aag	ttg	cca	cct	gtt	6669
Asp	Ala	Gly	Leu	Gly	Lys	Leu	Val	Asp	Met	Lys	Leu	Pro	Pro	Val	
2210				2215						2220					
gcc	ggc	atc	gcg	ttc	ggg	cct	ttg	gtg	ctg	cag	gat	gtc	atg	ctg	6714
Ala	Gly	Ile	Ala	Phe	Gly	Pro	Leu	Val	Leu	Gln	Asp	Val	Met	Leu	
2225				2230						2235					
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Lys	Asn	Met	Asp	His	Gln	Met	Met	Asp	Met	Val	Leu	Lys	Pro	Lys	
2240				2245						2250					
gta	caa	gga	gca	cgc	att	ctt	cat	gaa	cgg	ttc	tcc	gaa	cag	acg	6804
Val	Gln	Gly	Ala	Arg	Ile	Leu	His	Glu	Arg	Phe	Ser	Glu	Gln	Thr	
2255				2260						2265					
ggc	agc	aag	gcg	ctc	gac	ttc	ttc	atc	atg	ttt	tcg	tcc	att	gtt	6849
Gly	Ser	Lys	Ala	Leu	Asp	Phe	Phe	Ile	Met	Phe	Ser	Ser	Ile	Val	
2270				2275						2280					

gca gtt att ggc aat cct ggc	cag tcc aac tat ggc	gct gcg aat	6894
Ala Val Ile Gly Asn Pro Gly	Gln Ser Asn Tyr Gly	Ala Ala Asn	
2285	2290	2295	
gcc tac cta cag gct ctg gcc	cag caa cggtgc	aga gga ttg	6939
Ala Tyr Leu Gln Ala Leu Ala	Gln Gln Arg Cys	Ala Arg Gly Leu	
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gcg gga tca acc atc gat att	ggt gcc gtt tac ggt	gta ggg ttt	6984
Ala Gly Ser Thr Ile Asp Ile	Gly Ala Val Tyr Gly	Val Gly Phe	
2315	2320	2325	
gtc acg agg gcc gag atg gag	gag gac ttt gat gct	atc cgt ttc	7029
Val Thr Arg Ala Glu Met Glu	Glu Asp Phe Asp	Ala Ile Arg Phe	
2330	2335	2340	
atg ttt gac tca gtt gaa gag	cat gag ctg cac acg	ctt ttc gcc	7074
Met Phe Asp Ser Val Glu Glu	His Glu Leu His	Thr Leu Phe Ala	
2345	2350	2355	
gaa gcg gtc gtg tct gac cag	cgt gcc cggtca	cca cag cgc	7119
Glu Ala Val Val Ser Asp Gln	Arg Ala Arg Gln	Gln Pro Gln Arg	
2360	2365	2370	
aag acg gtc att gac atg gcg	gac ctt gag ctt acc	acg ggt atc	7164
Lys Thr Val Ile Asp Met Ala	Asp Leu Glu Leu	Thr Thr Gly Ile	
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cca gat ctt gac cct gcg ctt	caa gat cga att att	tac ttc aac	7209
Pro Asp Leu Asp Pro Ala Leu	Gln Asp Arg Ile	Ile Tyr Phe Asn	
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gac cct cgt ttc gga aac ttc	aaa att ccc ggt caa	cgc gga gac	7254
Asp Pro Arg Phe Gly Asn Phe	Lys Ile Pro Gly	Gln Arg Gly Asp	
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ggt ggc gac aat gga tca ggg	tct aaa ggc tcc att	gcc gac cag	7299
Gly Gly Asp Asn Gly Ser Gly	Ser Lys Gly Ser	Ile Ala Asp Gln	
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ctc aaa caa gca aca act tta	gac caa gtt cggtca	atc gtg att	7344
Leu Lys Gln Ala Thr Thr Leu	Asp Gln Val Arg	Gln Ile Val Ile	
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gat ggt cta tct gag aaa ctc	cgt gtt acc ctc caa	gtt tcg gac	7389
Asp Gly Leu Ser Glu Lys Leu	Arg Val Thr Leu	Gln Val Ser Asp	
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ggg gag agc gtg gac cca acc	att cct ctc att gat	caa ggt gtc	7434
Gly Glu Ser Val Asp Pro Thr	Ile Pro Leu Ile Asp	Gln Gly Val	
2465	2470	2475	
gac tcc ttg ggt gca gtg act	gtc ggc tca tgg ttc	tca aag caa	7479
Asp Ser Leu Gly Ala Val Thr	Val Gly Ser Trp Phe	Ser Lys Gln	
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ctc tac ctt gac ctc cca ctc	ttg agg gta ctt ggc	ggt gct tct	7524
Leu Tyr Leu Asp Leu Pro Leu	Leu Arg Val Leu	Gly Ala Ser	
2495	2500	2505	
gtc gct gat ctt gcc gac gac	gcg gcc acc cga ctc	cca gct aca	7569
Val Ala Asp Leu Ala Asp Asp	Ala Ala Thr Arg	Leu Pro Ala Thr	
2510	2515	2520	
tcc att ccg ctg ctg ttg caa	att ggt gat tcc acg	gga acc tcg	7614
Ser Ile Pro Leu Leu Leu Gln	Ile Gly Asp Ser	Thr Gly Thr Ser	
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gac agc ggg gct tct ccg aca	cca aca gac agc cat	gat gaa gca	7659
Asp Ser Gly Ala Ser Pro Thr	Pro Thr Asp Ser His	Asp Glu Ala	

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gag caa gag gac gat aat gag Glu Gln Glu Asp Asp Asn 2570	cag gga ggc cgt aag Gln Gly Gly Arg Lys 2575	att ctt cgt Ile Leu Arg 2580	7749
cgc gag agg ttg tcc ctt ggc Arg Glu Arg Leu Ser Leu Gly 2585	cag gag tat tcc tgg Gln Glu Tyr Ser Trp 2590	agg cag caa Arg Gln Gln 2595	7794
caa atg gta aaa gat cat acc Gln Met Val Lys Asp His Thr 2600	atc ttc aac aac act Ile Phe Asn Asn Thr 2605	att ggc atg Ile Gly Met 2610	7839
ttc atg aag ggt acc att gac Phe Met Lys Gly Thr Ile Asp 2615	ctc gac cgg ttg agg Leu Asp Arg Leu Arg 2620	cgg gct ctg Arg Ala Leu 2625	7884
aaa gcc tca ttg cgc cgt cac Lys Ala Ser Leu Arg Arg His 2630	gag atc ttc cgt acg Glu Ile Phe Arg Thr 2635	tgc ttt gtt Cys Phe Val 2640	7929
act ggc gat gac tat agc agc Thr Gly Asp Asp Tyr Ser Ser 2645	gat tta aat ggt ccc Asp Leu Asn Gly Pro 2650	gtc caa gtg Val Gln Val 2655	7974
gtt ctc aag aac ccg gag aac Val Leu Lys Asn Pro Glu Asn 2660	aga gtg cac ttt gtt Arg Val His Phe Val 2665	cag gtg aac Gln Val Asn 2670	8019
aac gct gcg gag gca gag gaa Asn Ala Ala Glu Ala Glu Glu 2675	gag tac cgg aaa ctc Glu Tyr Arg Lys Leu 2680	gag aag aca Glu Lys Thr 2685	8064
aac tat agc atc tcc aca ggt Asn Tyr Ser Ile Ser Thr Gly 2690	gac act ctc aga ctc Asp Thr Leu Arg Leu 2695	gtt gat ttc Val Asp Phe 2700	8109
tac tgg ggc aca gat gac cac Tyr Trp Gly Thr Asp Asp His 2705	ctg ttg gta atc ggc Leu Leu Val Ile Gly 2710	tac cac aga Tyr His Arg 2715	8154
tta gtt ggt gat ggc tca aca Leu Val Gly Asp Gly Ser Thr 2720	aca gaa aac ctg ttc Thr Glu Asn Leu Phe 2725	aat gag atc Asn Glu Ile 2730	8199
ggg cag att tac agc ggg gtg Gly Gln Ile Tyr Ser Gly Val 2735	aaa atg cag cga cca Lys Met Gln Arg Pro 2740	tcg acc caa Ser Thr Gln 2745	8244
ttc tct gat cta gcc gtc caa Phe Ser Asp Leu Ala Val Gln 2750	cag cgg gaa aac ctg Gln Arg Glu Asn Leu 2755	gaa aat ggg Glu Asn Gly 2760	8289
cga atg ggg gac gat atc gcg Arg Met Gly Asp Asp Ile Ala 2765	ttc tgg aag tcc atg Phe Trp Lys Ser Met 2770	cat agc aaa His Ser Lys 2775	8334
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aat gac cct gct gcc aat tca Asn Asp Pro Ala Ala Asn Ser 2795	gag cag cag caa ata Glu Gln Gln Ile 2800	cag cca ttc Gln Pro Phe 2805	8424

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Ala Phe Arg Ile Lys Glu Arg Ser Arg Lys His Lys Ala Thr Pro		
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Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu		
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Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val		
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Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly		
2885 2890 2895		
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Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln		
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His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu		
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Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala		
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Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu		
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Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu		
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Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser		
3005 3010 3015		
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<212> PRT
<213> Penicillium citrinum

<400> 44

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 20 25 30

Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
 35 40 45

Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
 50 55 60

Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
 65 70 75 80

Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
 85 90 95

Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
 100 105 110

Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr
 115 120 125

Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu
 130 135 140

Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala
 145 150 155 160

Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr
 165 170 175

Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val
 180 185 190

Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala
 195 200 205

Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn
 210 215 220 240

Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp
 225 230 235 240

Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu
 245 250 255

Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu
 260 265 270

Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn
 275 280 285

His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly
290 295 300

Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His
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Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala
325 330 335

Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu
340 345 350

Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr
355 360 365

Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val
370 375 380

Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro
385 390 395 400

Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr
405 410 415

Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn
420 425 430

Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr
435 440 445

Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser
450 455 460

Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln
465 470 475 480

Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr
485 490 495

His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys
500 505 510

Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu
515 520 525

Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val
530 535 540

Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val
545 550 555 560

Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met
565 570 575

Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser
 580 585 590

Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp
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Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe
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Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu
 625 630 635 640

Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly
 645 650 655

Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala
 660 665 670

Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser
 675 680 685

Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
 690 695 700

Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
 705 710 715 720

Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
 725 730 735

Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
 740 745 750

Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
 755 760 765

His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys
 770 775 780

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Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala
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Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val
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Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile
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Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp
850 855 860

Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn
865 870 875 880

Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu
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Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val
900 905 910

Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr
915 920 925

Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg
930 935 940

Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser
945 950 955 960

Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro
965 970 975

Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val
980 985 990

Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys
995 1000 1005

Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu
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Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr
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Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp
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Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu
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Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val
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Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro
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Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe
1100 1105 1110

Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp
1115 1120 1125

Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser
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Gly Thr Leu Ala Phe Leu Pro Leu Lys Asp Glu Leu Arg Asn Glu
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Pro Leu Leu Leu His Pro Ala Pro Leu Asp Ile Ala Phe Gln Thr
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Val Ile Gly Ala Tyr Ser Ser Pro Gly Asp Arg Arg Leu Arg Ser
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Leu Tyr Val Pro Thr His Val Asp Arg Val Thr Leu Ile Pro Ser
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Leu Cys Ile Ser Ala Gly Asn Ser Gly Glu Thr Glu Leu Ala Phe
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Ser Phe Leu Ala Gln Ile Thr Pro Asp Asp Arg Gln Asn Ala Asp
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Leu His Ser Gln Lys Tyr Ile Glu Trp Cys Asp Gln Val Gln Ala
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Glu Asp Thr Ser Val His Ile Glu Gln Met Cys Glu Ser Asn Ser
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Ser His Pro His Val Arg Leu Ile Gln Arg Val Gly Lys Glu Leu
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Ile Ser Ile Val Arg Gly Asn Gly Asp Pro Leu Asp Ile Met Asn
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Arg Asp Gly Leu Phe Thr Glu Tyr Tyr Thr Asn Lys Leu Ala Phe
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His Arg Tyr Gln Ser Ile Asp Ile Leu Glu Ile Gly Leu Gly Thr
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Gly Ile Ala Thr Lys Arg Val Leu Ala Ser Pro Gln Leu Gly Phe
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Asn Ser Tyr Thr Cys Thr Asp Ile Ser Ala Asp Val Ile Gly Lys
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Ala Arg Glu Gln Leu Ser Glu Phe Asp Gly Leu Met Gln Phe Glu
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Ala Leu Asp Ile Asn Arg Ser Pro Ala Glu Gln Gly Phe Lys Pro
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His Ser Tyr Asp Leu Ile Ile Ala Ser Asp Val Leu His Ala Ser
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Ser Asn Phe Glu Glu Lys Leu Ala His Ile Arg Ser Leu Leu Lys
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Pro Gly Gly His Leu Val Thr Phe Gly Val Thr His Arg Glu Pro
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Gly Glu Asp Glu Thr Arg Ala Leu Ser Ala Ser Gly Ser Val Asp
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Gln Trp Glu His Thr Leu Lys Arg Val Gly Phe Ser Gly Val Asp
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Ser Arg Thr Leu Asp Arg Glu Asp Asp Leu Ile Pro Ser Val Phe
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Ala Ser Thr Ile Gly Met Leu Arg Thr Ile Lys Leu Glu Asn Pro
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Asp Asp Gln Leu Leu Glu Ser Ile Thr Trp Thr His Glu Pro Glu
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Ala Arg Gly Ala Ser Ser Ser Met Tyr Tyr Leu Glu Ser Thr Glu
 1835 1840 1845

Thr Cys Asp Ser Leu Glu Asp Ala Arg His Ala Gly Lys Ala Thr
 1850 1855 1860

Val Arg Val Arg Tyr Ala Leu Pro Gln Ala Ile Arg Val Gly His
 1865 1870 1875

Leu Gly Tyr Phe His Val Val Gln Gly Ser Ile Leu Glu Asn Thr
 1880 1885 1890

Cys Glu Val Pro Val Val Ala Leu Ala Glu Lys Asn Gly Ser Ile
 1895 1900 1905

Leu His Val Pro Arg Asn Tyr Met His Ser Leu Pro Asp Asn Met
 1910 1915 1920

Ala Glu Gly Glu Asp Ser Ser Phe Leu Leu Ser Thr Ala Ala Ala
 1925 1930 1935

Leu Leu Ala Glu Thr Ile Leu Ser Ser Ala Gln Ser Phe Gly Ser
 1940 1945 1950

Asp Ala Ser Ile Leu Ile Met Glu Pro Pro Ile Phe Cys Val Lys
 1955 1960 1965

Ala Ile Leu Glu Ser Ala Lys Thr Tyr Gly Val Gln Val His Leu
 1970 1975 1980

Ala Thr Thr Leu Ser Asp Val Lys Thr Ile Pro Ala Pro Trp Ile
 1985 1990 1995

Arg Leu His Ala Lys Glu Thr Asp Ala Arg Leu Lys His Ser Leu
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Pro Thr Asn Met Met Ala Phe Phe Asp Leu Ser Thr Asp Arg Thr
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Leu Lys Gln Ala Thr Thr Leu Asp Gln Val Arg Gln Ile Val Ile
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Asp Gly Leu Ser Glu Lys Leu Arg Val Thr Leu Gln Val Ser Asp
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Gly Glu Ser Val Asp Pro Thr Ile Pro Leu Ile Asp Gln Gly Val
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Asp Ser Leu Gly Ala Val Thr Val Gly Ser Trp Phe Ser Lys Gln
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Leu Tyr Leu Asp Leu Pro Leu Leu Arg Val Leu Gly Gly Ala Ser
 2495 2500 2505

Val Ala Asp Leu Ala Asp Asp Ala Ala Thr Arg Leu Pro Ala Thr
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Ser Ile Pro Leu Leu Leu Gln Ile Gly Asp Ser Thr Gly Thr Ser
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Asp Ser Gly Ala Ser Pro Thr Pro Thr Asp Ser His Asp Glu Ala
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Ser Ser Ala Thr Ser Thr Asp Ala Ser Ser Ala Glu Glu Asp Glu
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Glu Gln Glu Asp Asp Asn Glu Gln Gly Gly Arg Lys Ile Leu Arg
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Arg Glu Arg Leu Ser Leu Gly Gln Glu Tyr Ser Trp Arg Gln Gln
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Gln Met Val Lys Asp His Thr Ile Phe Asn Asn Thr Ile Gly Met
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Phe Met Lys Gly Thr Ile Asp Leu Asp Arg Leu Arg Arg Ala Leu
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Lys Ala Ser Leu Arg Arg His Glu Ile Phe Arg Thr Cys Phe Val
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Thr Gly Asp Asp Tyr Ser Ser Asp Leu Asn Gly Pro Val Gln Val
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Val Leu Lys Asn Pro Glu Asn Arg Val His Phe Val Gln Val Asn
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- Asn Ala Ala Glu Ala Glu Glu Glu Tyr Arg Lys Leu Glu Lys Thr
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Asn Tyr Ser Ile Ser Thr Gly Asp Thr Leu Arg Leu Val Asp Phe
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Tyr Trp Gly Thr Asp Asp His Leu Leu Val Ile Gly Tyr His Arg
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Leu Val Gly Asp Gly Ser Thr Thr Glu Asn Leu Phe Asn Glu Ile
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Gly Gln Ile Tyr Ser Gly Val Lys Met Gln Arg Pro Ser Thr Gln
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Phe Ser Asp Leu Ala Val Gln Gln Arg Glu Asn Leu Glu Asn Gly
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Arg Met Gly Asp Asp Ile Ala Phe Trp Lys Ser Met His Ser Lys
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Val Ser Ser Ser Ala Pro Thr Val Leu Pro Ile Met Asn Leu Ile
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Asn Asp Pro Ala Ala Asn Ser Glu Gln Gln Ile Gln Pro Phe
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Ala Phe Arg Ile Lys Glu Arg Ser Arg Lys His Lys Ala Thr Pro
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Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu
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Thr Gly Ser Lys Asp Ile Thr Ile Gly Leu Ala Glu Thr Asn Arg
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Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val
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Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly
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Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln
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His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu
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Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala
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Ser Gly Ser Ile Gly Asn Ala Lys Met Thr Ser Val Leu Ala Ser
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Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp
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Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu
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Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile	
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gcc ata gtt gga atg gga tgt cga ttt gct gga gat gca acg agt cca	144
Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro	
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cag aag ctt tgg gaa atg gtt gaa aga gga ggc agt gcc tgg tct aag	192
Gln Lys Leu Trp Glu Met Val Glu Arg Gly Ser Ala Trp Ser Lys	
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Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly	
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gaa agg gtc ggg tcc acc cac gta aag ggt gga cac ttc atc gac gag	288
Glu Arg Val Gly Ser Thr His Val Lys Gly His Phe Ile Asp Glu	
85 90 95	

gat cct gct tta ttt gac gcc gcg ttc aac atg acc aca gag gtc	336
Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val	
100 105 110	

gcc agc tgc atg gat ccg cag tat cgg ctt atg ctt gag gtg gtc tac	384
Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr	
115 120 125	

gaa tcg ctg gag agt gcc ggt atc acc atc gat ggt atg gca ggc tct	432
Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser	
130 135 140	

aat acg tcg gtg ttt ggg ggt gtc atg tac cac gac tat cag gat tcg	480
Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser	
145 150 155 160	

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tca gga aca atg ctt tcg aac cgg ata tca cac ttc tac gac tta cgt Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg 180 185 190	576
ggc ccc agc gtg acg gtt gac acg gcc tgt tcg acg aca ttg acc gca Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala 195 200 205	624
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atc gtt atc ggt gca aat ctt ctg ctc aat ccc gat gtt ttt gtt acg Ile Val Ile Gly Ala Asn Leu Leu Asn Pro Asp Val Phe Val Thr 225 230 235 240	720
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gta ata aag gcc ctc cct aac gcg ttg cga gac caa gac cct atc cga Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg 275 280 285	864
gcc gtc att cga gag aca gcg ctg aac cag gat ggc aaa aca ccc gca Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala 290 295 300	912
att act gcg ccg agt gat gtg gcg cag aaa agt ctg atc cag gag tgt Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys 305 310 315 320	960
tac gat aag gct ggg cta gat atg tcg ttg acc tcg tac gtg gag gcc Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala 325 330 335	1008
cac gga act gga aca cca act ggt gac ccc ctt gaa atc tca gca att His Gly Thr Gly Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile 340 345 350	1056
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ccc atg tct gct caa gac tgg cct gtg aaa gat ggg act cgt cgc gca Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala 420 425 430	1296
tct gtc aat aac ttc ggc ttt ggt ggt tcg aat gct cac gtc att ttg Ser Val Asn Asn Phe Gly Gly Ser Asn Ala His Val Ile Leu	1344

435	440	445		
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gtc aat ggt aac tct gag cat ggt agg gtt gag gat ggt tcc aaa cag Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln 465	470	475	480	1440
agc cgc ata tac gtt gtg cgt gcc aag gac gag caa gct tgt cgg cga Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg 485	490	495	1488	
acg ata gca agc ctg cga gac tac att aaa tcc gtc gct gac att gac Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp 500	505	510	1536	
ggg gaa ccc ttc ctc gcc agc ctc gcc tat aca cta ggc tct cgc cgt Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg 515	520	525	1584	
tcc att ctg cca tgg acg tca gtg tat gta gca gac agc ctt ggc ggc Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly 530	535	540	1632	
ctt gtt tct gcc ctc agc gat gag tcc aat caa cca aaa cga gcg aat Leu Val Ser Ala Leu Ser Asp Glu Ser Asn Gln Pro Lys Arg Ala Asn 545	550	555	560	1680
gag aaa gta cgg ctc gga ttt gta ttc acc ggt cag ggg gcg cag tgg Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp 565	570	575	1728	
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gat gcc gaa tac agt cta cca ctg tca acc gct atc caa att gca ctt Asp Ala Glu Tyr Ser Leu Pro Leu Ser Thr Ala Ile Gln Ile Ala Leu 625	630	635	640	1920
gtg cgt ctc ctt tgg tca tgg gga att cgg cca acg ggg ata acc agt Val Arg Leu Leu Trp Ser Trp Gly Ile Arg Pro Thr Gly Ile Thr Ser 645	650	655	660	1968
cac tca agt gga gag gct gct gca tac gca gct ggg gct tta tcc His Ser Ser Gly Glu Ala Ala Ala Tyr Ala Ala Gly Ala Leu Ser 660	665	670	675	2016
gcg cgg tcg gcc att ggg atc act tat ata cgc ggt gta ttg acc act Ala Arg Ser Ala Ile Gly Ile Thr Tyr Ile Arg Gly Val Leu Thr Thr 675	680	685	690	2064
aag ccc aag ccc gca ttg gca gcc aaa gga gga atg atg gcg gtg ggt Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly 690	695	700	705	2112
ctt ggt cgc agt gag acc aat gtt tac att tcg cgt ctc aac cag gag Leu Gly Arg Ser Glu Thr Asn Val Tyr Ile Ser Arg Leu Asn Gln Glu 710	715	720	725	2160

gac ggc tgt gtg gtt gga tgt atc aac agt caa tgt agt gtg acg Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr 725 730 735	2208
gtg tcg gga gat ttg ggt gca atc gag aaa ctt gaa aag ttg tta cac Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His 740 745 750	2256
gcc gat ggc atc ttt acc agg aaa ctg aaa gtc act gaa gcc ttc cat Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His 755 760 765	2304
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gat ctg ttc aac tcg gat aac aac aac gac aat ccc aat gct gac acc Asp Leu Phe Asn Ser Asp Asn Asn Asp Asn Pro Asn Ala Asp Thr 785 790 795 800	2400
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cag ccg gta gag ttc gag tcc tca ctc cgc gag atg tgc ttt gat ccc Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro 835 840 845	2544
aac acc aaa gag aaa gcc gtc gat gtg att att gaa ata ggg cct cac Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His 850 855 860	2592
gga gcg ctt ggt ggt cca atc aac caa gtc atg cag gat ctg ggt ctg Gly Ala Leu Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu 865 870 875 880	2640
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tcg ttg gag aca atg tat cgt gct acg gag ttg ata agc aag ggt Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly 900 905 910	2736
tat ggg ctc aaa atg gac gct ata aac ttt cct cat gga aga aaa gag Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu 915 920 925	2784
ccc aga gtg aag gta ctg agc gat ttg ccg gcg tac ccg tgg aat cac Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His 930 935 940	2832
caa acc cgt tat tgg aga gag cct cgc ggc agt cgt gag tcc aaa cag Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln 945 950 955 960	2880
aga acc cat ccg cct cac act ttg ata ggc tca cgg gaa tct ctc tct Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser 965 970 975	2928
cct cat ttc gcg cct aaa tgg aaa cat gtt ctc cgt ctg tca gat att Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile 980 985 990	2976
cca tgg ata cga gat cac gtc gtt ggt tcg agc atc atc ttt ccg gga Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly	3024

995

1000

1005

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Pro	Pro	Val	Ala	Gly	Ala	Ser	Ile	Asn	Tyr	Asn	Leu	Arg	Asp	Val	
1025						1030					1035				
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Glu	Leu	Ala	Gln	Ala	Leu	Ile	Ile	Pro	Ala	Asp	Ala	Glu	Ala	Glu	
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Val	Asp	Leu	Arg	Leu	Thr	Ile	Arg	Ser	Cys	Glu	Glu	Arg	Ser	Leu	
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Gly	Thr	Lys	Asn	Trp	His	Gln	Phe	Ser	Val	His	Ser	Ile	Ser	Gly	
1070						1075					1080				
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Glu	Asn	Asn	Thr	Trp	Trp	Glu	His	Cys	Thr	Gly	Leu	Ile	Arg	Ser	
1085						1090					1095				
gag	agc	gaa	aga	agc	cac	ctt	gac	tgt	tca	act	gtg	gaa	gcc	tca	3339
Glu	Ser	Glu	Arg	Ser	His	Leu	Asp	Cys	Ser	Thr	Val	Glu	Ala	Ser	
1100						1105					1110				
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Asp	Leu	Trp	Glu	Ser	Leu	His	Ala	Asn	Gly	Ile	Cys	His	Gly	Pro	
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Ile	Phe	Gln	Asn	Ile	Gln	Arg	Ile	Gln	Asn	Asn	Gly	Gln	Gly	Ser	
1145						1150					1155				
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Phe	Cys	Arg	Phe	Ser	Ile	Ala	Asp	Thr	Ala	Ser	Ala	Met	Pro	His	
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Ser	Tyr	Glu	Asn	Arg	His	Ile	Val	His	Pro	Thr	Thr	Leu	Asp	Ser	
1175						1180					1185				
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Val	Ile	Gln	Ala	Ala	Tyr	Thr	Val	Leu	Pro	Tyr	Ala	Gly	Thr	Arg	
1190						1195					1200				
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Met	Lys	Thr	Ala	Met	Val	Pro	Arg	Arg	Leu	Arg	Asn	Val	Lys	Ile	
1205						1210					1215				
tcc	tct	agc	ctg	gct	gac	ttg	gag	gct	ggg	gat	gct	ctg	gac	gca	3699
Ser	Ser	Ser	Leu	Ala	Asp	Leu	Glu	Ala	Gly	Asp	Ala	Leu	Asp	Ala	
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Gln	Ala	Ser	Ile	Lys	Asp	Arg	Asn	Ser	Gln	Ser	Phe	Ser	Thr	Asp	
1235						1240					1245				
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Leu	Ala	Val	Phe	Asp	Asp	Tyr	Asp	Ser	Gly	Ser	Ser	Pro	Ser	Asp	
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Gly Ile Pro Val Ile Glu Ile	Glu Gly Leu Val Phe	Gln Ser Val	
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Gly Ser Ser Phe Ser Asp Gln	Lys Ser Asp Ser Asn	Asp Thr Glu	
1280 1285	1290		
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Asn Ala Cys Ser Ser Trp Val	Trp Ala Pro Asp Ile	Ser Leu Gly	
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Asp Ser Thr Trp Leu Lys Glu	Lys Leu Ser Thr Glu	Ala Glu Thr	
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Lys Glu Thr Glu Leu Met Met	Asp Leu Arg Arg Cys	Thr Ile Asn	
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Phe Ile Gln Glu Ala Val Thr	Asp Leu Thr Asn Ser	Asp Ile Gln	
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His Leu Asp Gly His Leu Gln	Lys Tyr Phe Asp Trp	Met Asn Val	
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Gln Leu Asp Leu Ala Arg Gln	Asn Lys Leu Ser Pro	Ala Ser Cys	
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Asp Trp Leu Ser Asp Asp Ala	Glu Gln Lys Lys Cys	Leu Gln Ala	
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Glu Leu Met Met Gln Asp Gln	Leu Leu Ser Arg Tyr	Tyr Val Asn	
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Arg Leu Cys Ala His Lys Asn	Pro Arg Ser Arg Ile	Leu Glu Ile	
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Ala Gly Phe Phe Glu Ser Ala	Arg Glu Gln Phe Ala	Asp Trp Gln	
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Asp Val Met Thr Phe Lys Lys	Leu Asp Ile Glu Ser	Asp Pro Glu	

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Gln Val Leu His Ala Thr Arg Cys Met Lys Arg Thr	Leu Ser Asn		
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act acc agg gat cag ctc gat ttg ttc ttt acc ttc	gga ctg ttg		4779
Thr Thr Arg Asp Gln Leu Asp Leu Phe Phe Thr Phe	Gly Leu Leu		
1580 1585 1590			
cca ggt tgg tgg ctc agt gag gag cct gag cgg aag	tgc acg cca		4824
Pro Gly Trp Trp Leu Ser Glu Glu Pro Glu Arg Lys	Ser Thr Pro		
1595 1600 1605			
tcg ctc act acc gat ctt tgg aac acc atg ttg gac	acg agc ggt		4869
Ser Leu Thr Thr Asp Leu Trp Asn Thr Met Leu Asp	Thr Ser Gly		
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Phe Asn Gly Val Glu Leu Glu Val Arg Asp Cys Glu	Asp Asp Glu		
1625 1630 1635			
ttt tac atg atc agc aca atg cta tcg acg gct aga	aaa gag aat		4959
Phe Tyr Met Ile Ser Thr Met Leu Ser Thr Ala Arg	Lys Glu Asn		
1640 1645 1650			
aca acc ccg gat aca gtg gca gaa tcg gag gtg ctt	ttg ctg cac		5004
Thr Thr Pro Asp Thr Val Ala Glu Ser Glu Val Leu	Leu Leu His		
1655 1660 1665			
gga gcg ctc cga cct cct tca tct tgg ctg gaa agt	ctc cag gca		5049
Gly Ala Leu Arg Pro Pro Ser Ser Trp Leu Glu Ser	Leu Gln Ala		
1670 1675 1680			
gca att tgt gaa aag acc agt tct agc cca tcg atc	aac gct ctg		5094
Ala Ile Cys Glu Lys Thr Ser Ser Ser Pro Ser Ile	Asn Ala Leu		
1685 1690 1695			
ggc gag gta gat acc act gga agg aca tcg att ttt	ctt ggg gaa		5139
Gly Glu Val Asp Thr Thr Gly Arg Thr Cys Ile Phe	Leu Gly Glu		
1700 1705 1710			
atg gag tcc tcg ctc ctt gga gag gtg gga agc gag	acc ttc aaa		5184
Met Glu Ser Ser Leu Leu Gly Glu Val Gly Ser Glu	Thr Phe Lys		
1715 1720 1725			
tcc atc acc gcg atg ctg aat aac tgc aac gca ctt	ctc tgg gtg		5229
Ser Ile Thr Ala Met Leu Asn Asn Cys Asn Ala Leu	Leu Trp Val		
1730 1735 1740			
tct aga gga gca gcc atg agc tcc gag gat cca tgg	aaa gct cta		5274
Ser Arg Gly Ala Ala Met Ser Ser Glu Asp Pro Trp	Lys Ala Leu		
1745 1750 1755			
cat att ggt ctg ctg cgt acc atc cgc aac gaa aat	aac ggg aag		5319
His Ile Gly Leu Leu Arg Thr Ile Arg Asn Glu Asn	Asn Gly Lys		
1760 1765 1770			
gaa tat gta tcg ttg gat ctc gat cct tct cga aac	gca tac acc		5364
Glu Tyr Val Ser Leu Asp Leu Asp Pro Ser Arg Asn	Ala Tyr Thr		
1775 1780 1785			

cac gag tcc ctg tat gct atc	tgc aat atc ttc aat	ggc cgc ctc	5409
His Glu Ser Leu Tyr Ala Ile	Cys Asn Ile Phe Asn	Gly Arg Leu	
1790 1795 1800			
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Gly Asp Leu Ser Glu Asp Lys	Glu Phe Glu Phe Ala	Glu Arg Asn	
1805 1810 1815			
ggc gtc atc cac gta ccg cga	ctt ttc aat gac ccg	cac tgg aag	5499
Gly Val Ile His Val Pro Arg	Leu Phe Asn Asp Pro	His Trp Lys	
1820 1825 1830			
gac caa gaa gcg gtt gag gtc	aca ctg cag ccg ttc	gag caa ccc	5544
Asp Gln Glu Ala Val Glu Val	Thr Leu Gln Pro Phe	Glu Gln Pro	
1835 1840 1845			
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Gly Arg Arg Leu Arg Met Glu	Val Glu Thr Pro Gly	Leu Leu Asp	
1850 1855 1860			
tcc ctg caa ttt cga gac gac	gaa gga cgt gaa ggc	aag gat ctt	5634
Ser Leu Gln Phe Arg Asp Asp	Glu Gly Arg Glu Gly	Lys Asp Leu	
1865 1870 1875			
ccg gat gat tgg gta gaa atc	gaa ccc aaa gct ttc	ggt ctc aat	5679
Pro Asp Asp Trp Val Glu Ile	Glu Pro Lys Ala Phe	Gly Leu Asn	
1880 1885 1890			
ttt cgg gat gtc atg gtt gcc	atg ggt caa ttg gag	gcc aac cgt	5724
Phe Arg Asp Val Met Val Ala	Met Gly Gln Leu Glu	Ala Asn Arg	
1895 1900 1905			
gtg atg ggc ttc gaa tgc gcc	gga gtg atc aca aag	ctc ggt gga	5769
Val Met Gly Phe Glu Cys Ala	Gly Val Ile Thr Lys	Leu Gly Gly	
1910 1915 1920			
gct gct gcc gct agc caa ggc	ctc aga tta ggg gac	cgc gta tgt	5814
Ala Ala Ala Ala Ser Gln Gly	Leu Arg Leu Gly Asp	Arg Val Cys	
1925 1930 1935			
gca cta ctg aaa ggc cat tgg	gcg acc aga aca cag	acg ccg tac	5859
Ala Leu Leu Lys Gly His Trp	Ala Thr Arg Thr Gln	Thr Pro Tyr	
1940 1945 1950			
act aat gtc gtc cgt att ccg	gac gaa atg ggc ttc	cca gaa gcc	5904
Thr Asn Val Val Arg Ile Pro	Asp Glu Met Gly Phe	Pro Glu Ala	
1955 1960 1965			
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Ala Ser Val Pro Leu Ala Phe	Thr Thr Ala Tyr Ile	Ala Leu Tyr	
1970 1975 1980			
acc acg gca aag cta cga cga	ggc gaa aga gtc ttg	atc cac agt	5994
Thr Thr Ala Lys Leu Arg Arg	Gly Glu Arg Val Leu	Ile His Ser	
1985 1990 1995			
gga gct gga ggc gtc ggt caa	gca gcg atc att ttg	tcc cag ctt	6039
Gly Ala Gly Gly Val Gly Gln	Ala Ala Ile Ile Leu	Ser Gln Leu	
2000 2005 2010			
gcg ggt gcc gag gtc ttc gtc	aca gcg gga act caa	gcc aag cgt	6084
Ala Gly Ala Glu Val Phe Val	Thr Ala Gly Thr Gln	Ala Lys Arg	
2015 2020 2025			
gac ttt gtc ggc gat aaa ttc	ggc atc aat ccg gat	cat atc ttc	6129
Asp Phe Val Gly Asp Lys Phe	Gly Ile Asn Pro Asp	His Ile Phe	
2030 2035 2040			
tcg agc agg aat gac tta ttc	gtc gac ggc atc aaa	gcc tac acg	6174
Ser Ser Arg Asn Asp Leu Phe	Val Asp Gly Ile Lys	Ala Tyr Thr	

2045	2050	2055	
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Gly Gly Leu Gly Val His Val	Val Leu Asn Ser Leu	Ala Gly Gln	
2060 2065	2070	2075	
ctc ctc caa gca agc ttt gac	tgc atg gcc gaa ttc	gac gaa ttt	6264
Leu Leu Gln Ala Ser Phe Asp	Cys Met Ala Glu Phe	Gly Arg Phe	
2075 2080	2085	2085	
gtt gag att gga aaa aag gac	ctg gag caa aac agc	aga ctt gac	6309
Val Glu Ile Gly Lys Lys Asp	Leu Glu Gln Asn Ser	Arg Leu Asp	
2090 2095	2100	2100	
atg ctg cca ttc acc cgg gac	gtc tct ttc aca tca	att gat ctt	6354
Met Leu Pro Phe Thr Arg Asp	Val Ser Phe Thr Ser	Ile Asp Leu	
2105 2110	2115	2115	
ctc tcg tgg caa aga gcc aaa	agt gaa gaa gta tcc	gaa gcg ttg	6399
Leu Ser Trp Gln Arg Ala Lys	Ser Glu Glu Val Ser	Glu Ala Leu	
2120 2125	2130	2130	
aac cat gtc aca aaa ctc ctc	gag aca aaa gcg att	gac ttg att	6444
Asn His Val Thr Lys Leu Leu	Glu Thr Lys Ala Ile	Gly Leu Ile	
2135 2140	2145	2145	
ggc cca atc cag cag cac tcc	ttg tca aac atc gag	aag gcc ttc	6489
Gly Pro Ile Gln Gln His Ser	Leu Ser Asn Ile Glu	Lys Ala Phe	
2150 2155	2160	2160	
cgt acg atg cag agt ggt cag	cat gtt ggc aaa gtt	gtg gtc aat	6534
Arg Thr Met Gln Ser Gly Gln	His Val Gly Lys Val	Val Val Asn	
2165 2170	2175	2175	
gta tct ggg gac gaa ctg gtc	cca gtc ggc gat gga	ggg ttc tcg	6579
Val Ser Gly Asp Glu Leu Val	Pro Val Gly Asp Gly	Gly Phe Ser	
2180 2185	2190	2190	
ctg aag ctg aag cct gac agt	tct tac cta gtt gct	ggt ggg ctg	6624
Leu Lys Leu Lys Pro Asp Ser	Ser Tyr Leu Val Ala	Gly Gly Leu	
2195 2200	2205	2205	
ggg gga att gga aag cag atc	tgt cag tgg ctt gtt	gat cat ggc	6669
Gly Gly Ile Gly Lys Gln Ile	Cys Gln Trp Leu Val	Asp His Gly	
2210 2215	2220	2220	
gcf aag cac ttg att atc cta	tcg aga agt gca aag	gcc agt cca	6714
Ala Lys His Leu Ile Ile Leu	Ser Arg Ser Ala Lys	Ala Ser Pro	
2225 2230	2235	2235	
tcc ata acc agc ttg caa aat	caa cag tgc gct gtc	tat cta cac	6759
Phe Ile Thr Ser Leu Gln Asn	Gln Gln Cys Ala Val	Tyr Leu His	
2240 2245	2250	2250	
gca tgt gac atc tca gat caa	gat cag gtc acc aag	gtg ctc cg	6804
Ala Cys Asp Ile Ser Asp Gln	Asp Gln Val Thr Lys	Val Leu Arg	
2255 2260	2265	2265	
ttg tgc gaa gaa gca cat gca	ccg cca att cga ggt	atc ata caa	6849
Leu Cys Glu Glu Ala His Ala	Pro Pro Ile Arg Gly	Ile Ile Gln	
2270 2275	2280	2280	
ggt gcc atg gtt ctc aag gac	gcg ctt cta tcg cga	atg aca ttg	6894
Gly Ala Met Val Leu Lys Asp	Ala Leu Leu Ser Arg	Met Thr Leu	
2285 2290	2295	2295	
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Asp Glu Phe Asn Ala Ala Thr	Arg Pro Lys Val Gln	Gly Ser Trp	
2300 2305	2310	2310	

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Tyr Leu His Lys Ile Ala Gln	Asp Val Asp Phe Phe	Val Met Leu	
2315	2320	2325	
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Ser Ser Leu Val Gly Val Met	Gly Gly Ala Gly Gln	Ala Asn Tyr	
2330	2335	2340	
gca gct gct ggt gca ttc cag	gac gca ctt gcg cac	cac cgg aga	7074
Ala Ala Ala Gly Ala Phe Gln	Asp Ala Leu Ala His	His Arg Arg	
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gcc cat ggc atg ccg gct gtc	acc att gac ttg ggc	atg gtc aag	7119
Ala His Gly Met Pro Ala Val	Thr Ile Asp Leu Gly	Met Val Lys	
2360	2365	2370	
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Ser Val Gly Tyr Val Ala Glu	Thr Gly Arg Gly Val	Ala Asp Arg	
2375	2380	2385	
ctc gct aga ata ggt tac aag	cct atg cat gaa aag	gac gtc atg	7209
Leu Ala Arg Ile Gly Tyr Lys	Pro Met His Glu Lys	Asp Val Met	
2390	2395	2400	
gat gtg ttg gag aag gca atc	ctg tgt tct tcc cct	caa ttt cca	7254
Asp Val Leu Glu Lys Ala Ile	Leu Cys Ser Ser Pro	Gln Phe Pro	
2405	2410	2415	
tca cct ccc gca gct gtg gtt	aca gga atc aac aca	tcc ccg ggt	7299
Ser Pro Pro Ala Ala Val Val	Thr Gly Ile Asn Thr	Ser Pro Gly	
2420	2425	2430	
gct cac tgg acc gag gca aac	tgg ata cag gaa cag	cgg ttt gtg	7344
Ala His Trp Thr Glu Ala Asn	Trp Ile Gln Glu Gln	Arg Phe Val	
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gga ctt aaa tac cgc caa gtc	ctt cat gca gac caa	tcc ttt gtc	7389
Gly Leu Lys Tyr Arg Gln Val	Leu His Ala Asp Gln	Ser Phe Val	
2450	2455	2460	
tct tcg cat aaa aaa gga cca	gat ggc gtg cgg gcc	caa cta agc	7434
Ser Ser His Lys Lys Gly	Pro Asp Gly Val Arg Ala	Gln Leu Ser	
2465	2470	2475	
agg gtc acc tct cac gac gag	gcc att tct atc gtc	ctc aaa gca	7479
Arg Val Thr Ser His Asp	Glu Ala Ile Ser Ile Val	Leu Lys Ala	
2480	2485	2490	
atg acg gaa aag ctg atg cga	atg ttt ggt ctg gca	gaa gac gac	7524
Met Thr Glu Lys Leu Met Arg	Met Phe Gly Leu Ala	Glu Asp Asp	
2495	2500	2505	
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Met Ser Ser Ser Lys Asn Leu	Ala Gly Val Gly Val	Asp Ser Leu	
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gtc gcc att gaa ctt cga aac	tgg atc aca tct gaa	atc cat gtt	7614
Val Ala Ile Glu Leu Arg Asn	Trp Ile Thr Ser Glu	Ile His Val	
2525	2530	2535	
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Asp Val Ser Ile Phe Glu Leu	Met Asn Gly Asn Thr	Ile Ala Gly	
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<212> PRT
<213> Penicillium citrinum

<400> 46

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Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile
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Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro
35 40 45

Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys
50 55 60

Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly
65 70 75 80

Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu
85 90 95

Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val
100 105 110

Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr
115 120 125

Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser
130 135 140

Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser
145 150 155 160

Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn
165 170 175

Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg
180 185 190

Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala
195 200 205

Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala
210 215 220

Ile Val Ile Gly Ala Asn Leu Leu Asn Pro Asp Val Phe Val Thr
225 230 235 240

Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe
245 250 255

Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu
 260 265 270

Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg
 275 280 285

Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala
 290 295 300

Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys
 305 310 315 320

Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala
 325 330 335

His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
 340 345 350

Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala
 355 360 365

Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys
 370 375 380

Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe
 385 390 395 400

Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile
 405 410 415

Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala
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Ser Val Asn Asn Phe Gly Phe Gly Ser Asn Ala His Val Ile Leu
 435 440 445

Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His
 450 455 460

Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln
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Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg
 485 490 495

Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp
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Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg
 515 520 525

Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly
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Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp
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His Ala Met Gly Arg Glu Leu Val Asn Thr Phe Pro Val Phe Lys Gln
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Ala Ile Leu Glu Cys Asp Gly Tyr Ile Lys Gln Leu Gly Ala Ser Trp
595 600 605

Asn Phe Met Glu Glu Leu His Arg Asp Glu Leu Thr Thr Arg Val Asn
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Asp Ala Glu Tyr Ser Leu Pro Leu Ser Thr Ala Ile Gln Ile Ala Leu
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Val Arg Leu Leu Trp Ser Trp Gly Ile Arg Pro Thr Gly Ile Thr Ser
645 650 655

His Ser Ser Gly Glu Ala Ala Ala Ala Tyr Ala Ala Gly Ala Leu Ser
660 665 670

Ala Arg Ser Ala Ile Gly Ile Thr Tyr Ile Arg Gly Val Leu Thr Thr
675 680 685

Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly
690 695 700

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725 730 735

Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His
740 745 750

Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His
755 760 765

Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg
770 775 780

Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr
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Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr
805 810 815

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Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro
 835 840 845

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Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly
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Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu
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Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
 930 935 940

Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
 945 950 955 960

Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
 965 970 975

Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
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Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
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Ile Phe Gln Asn Ile Gln Arg Ile Gln Asn Asn Gly Gln Gly Ser
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Lys Glu Thr Glu Leu Met Met Asp Leu Arg Arg Cys Thr Ile Asn
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Phe Ile Gln Glu Ala Val Thr Asp Leu Thr Asn Ser Asp Ile Gln
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His Leu Asp Gly His Leu Gln Lys Tyr Phe Asp Trp Met Asn Val
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Asp Val Met Thr Phe Lys Lys Leu Asp Ile Glu Ser Asp Pro Glu
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 1850 1855 1860

Ser Leu Gln Phe Arg Asp Asp Glu Gly Arg Glu Gly Lys Asp Leu
 1865 1870 1875

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 1880 1885 1890

Phe Arg Asp Val Met Val Ala Met Gly Gln Leu Glu Ala Asn Arg
 1895 1900 1905

Val Met Gly Phe Glu Cys Ala Gly Val Ile Thr Lys Leu Gly Gly
 1910 1915 1920

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 1925 1930 1935

Ala Leu Leu Lys Gly His Trp Ala Thr Arg Thr Gln Thr Pro Tyr
 1940 1945 1950

Thr Asn Val Val Arg Ile Pro Asp Glu Met Gly Phe Pro Glu Ala
 1955 1960 1965

Ala Ser Val Pro Leu Ala Phe Thr Thr Ala Tyr Ile Ala Leu Tyr
 1970 1975 1980

Thr Thr Ala Lys Leu Arg Arg Gly Glu Arg Val Leu Ile His Ser
 1985 1990 1995

Gly Ala Gly Gly Val Gly Gln Ala Ala Ile Ile Leu Ser Gln Leu
 2000 2005 2010

Ala Gly Ala Glu Val Phe Val Thr Ala Gly Thr Gln Ala Lys Arg
 2015 2020 2025

Asp Phe Val Gly Asp Lys Phe Gly Ile Asn Pro Asp His Ile Phe
 2030 2035 2040

Ser Ser Arg Asn Asp Leu Phe Val Asp Gly Ile Lys Ala Tyr Thr
 2045 2050 2055

Gly Gly Leu Gly Val His Val Val Leu Asn Ser Leu Ala Gly Gln
 2060 2065 2070

Leu Leu Gln Ala Ser Phe Asp Cys Met Ala Glu Phe Gly Arg Phe
 2075 2080 2085

Val Glu Ile Gly Lys Lys Asp Leu Glu Gln Asn Ser Arg Leu Asp
 2090 2095 2100

Met Leu Pro Phe Thr Arg Asp Val Ser Phe Thr Ser Ile Asp Leu
 2105 2110 2115

Leu Ser Trp Gln Arg Ala Lys Ser Glu Glu Val Ser Glu Ala Leu
 2120 2125 2130

Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile
 2135 2140 2145

Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe
 2150 2155 2160

Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn
 2165 2170 2175

Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser
 2180 2185 2190

Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu
 2195 2200 2205

Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly
 2210 2215 2220

Ala Lys His Leu Ile Ile Leu Ser Arg Ser Ala Lys Ala Ser Pro
 2225 2230 2235

Phe Ile Thr Ser Leu Gln Asn Gln Gln Cys Ala Val Tyr Leu His
 2240 2245 2250

Ala Cys Asp Ile Ser Asp Gln Asp Gln Val Thr Lys Val Leu Arg
 2255 2260 2265

Leu Cys Glu Glu Ala His Ala Pro Pro Ile Arg Gly Ile Ile Gln
 2270 2275 2280

Gly Ala Met Val Leu Lys Asp Ala Leu Leu Ser Arg Met Thr Leu
 2285 2290 2295

Asp Glu Phe Asn Ala Ala Thr Arg Pro Lys Val Gln Gly Ser Trp
 2300 2305 2310

Tyr Leu His Lys Ile Ala Gln Asp Val Asp Phe Phe Val Met Leu
 2315 2320 2325

Ser Ser Leu Val Gly Val Met Gly Gly Ala Gly Gln Ala Asn Tyr
 2330 2335 2340

Ala Ala Ala Gly Ala Phe Gln Asp Ala Leu Ala His His Arg Arg
 2345 2350 2355

Ala His Gly Met Pro Ala Val Thr Ile Asp Leu Gly Met Val Lys
 2360 2365 2370

Ser Val Gly Tyr Val Ala Glu Thr Gly Arg Gly Val Ala Asp Arg
 2375 2380 2385

Leu Ala Arg Ile Gly Tyr Lys Pro Met His Glu Lys Asp Val Met
 2390 2395 2400

Asp Val Leu Glu Lys Ala Ile Leu Cys Ser Ser Pro Gln Phe Pro
 2405 2410 2415

Ser Pro Pro Ala Ala Val Val Thr Gly Ile Asn Thr Ser Pro Gly
 2420 2425 2430

Ala His Trp Thr Glu Ala Asn Trp Ile Gln Glu Gln Arg Phe Val
 2435 2440 2445

Gly Leu Lys Tyr Arg Gln Val Leu His Ala Asp Gln Ser Phe Val
 2450 2455 2460

Ser Ser His Lys Lys Gly Pro Asp Gly Val Arg Ala Gln Leu Ser
 2465 2470 2475

Arg Val Thr Ser His Asp Glu Ala Ile Ser Ile Val Leu Lys Ala
 2480 2485 2490

Met Thr Glu Lys Leu Met Arg Met Phe Gly Leu Ala Glu Asp Asp
 2495 2500 2505

Met Ser Ser Ser Lys Asn Leu Ala Gly Val Gly Val Asp Ser Leu
 2510 2515 2520

Val Ala Ile Glu Leu Arg Asn Trp Ile Thr Ser Glu Ile His Val
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Asp Val Ser Ile Phe Glu Leu Met Asn Gly Asn Thr Ile Ala Gly
 2540 2545 2550

Leu Val Glu Leu Val Val Ala Lys Cys Ser
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acc cct caa gcc ctt gtg gcg gtc gca gtg ctt ctt agt ctc atc gcc 96
Thr Pro Gln Ala Leu Val Ala Val Leu Leu Ser Leu Ile Ala
20 25 30

tac cgt ttg cgg ggg cgc cag tcc gaa ctg caa gtc tat aat ccc aaa 144
Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys
35 40 45

aaa tgg tgg gag ttg acg acc atg agg gct agg cag gac ttc gat acg 192
Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr
50 55 60

tat ggt ccg agc tgg atc gaa gct tgg ttc tcg aaa aac gac aag ccc Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro 65 70 75 80	240
ctg cgc ttc att gtt gat tcc ggc tat tgc acc atc ctc cca tcg tcc Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser 85 90 95	288
atg gcc gac gag ttt cgg aaa atc aaa gat atg tgc atg tac aag ttt Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe 100 105 110	336
ttg gcg gat gac ttt cac tct cat ctc cct gga ttc gac ggg ttc aag Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys 115 120 125	384
gaa atc tgc cag gat gca cat ctt gtc aac aaa gtt gtt ttg aac cag Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln 130 135 140	432
tta caa acc caa gcc ccc aag tac aca aag cca ttg gct acc ttg gcc Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala 145 150 155 160	480
gac gct act att gcc aag ttg ttc ggt aaa agc gag gag tgg caa acc Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr 165 170 175	528
gca cct gtc tat tcc aat gga ttg gac ctt gtc aca cga aca gtc aca Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr 180 185 190	576
ctc att atg gtc ggc gac aaa atc tgc cac aat gag gag tgg ctg gat Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp 195 200 205	624
att gca aag aac cat gcc gtg agt gtg gcg gta caa gct cgc caa ctt Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu 210 215 220	672
cgc gta tgg ccc atg cta ctg cga ccg ctc gct cac tgg ttt caa ccg Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro 225 230 235 240	720
caa gga cgc aaa ttg cgt gac caa gtg cgc cgc gca cga aag atc att Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile 245 250 255	768
gat cct gag att cag cga cga cgt gct gaa aag gcc gca tgt gta gcg Asp Pro Glu Ile Gln Arg Arg Ala Glu Lys Ala Ala Cys Val Ala 260 265 270	816
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gac acc gcc gac ggc cgc tgg tac gat gtg gcg ggt gct cag ctc gct Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala 290 295 300	912
atg gat ttc gcc ggc atc tac gcc tcg acg gat ctt ttc gtc ggt gcc Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala 305 310 315 320	960
ctt gtg gac att gcc agg cac cca gac ctt att cag cct ctc cgc caa Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln 325 330 335	1008
gag atc cgc act gta atc gga gaa ggg ggc tgg acg cct gcc tct ctg Glu Ile Arg Thr Val Ile Gly Glu Gly Trp Thr Pro Ala Ser Leu	1056

340

345

350

ttc aag ctg aag ctc ctc gac agc tgc atg aaa gag acg cag cga atc
 Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
 355 360 365

aag ccg gtc gag tgc gcc act atg cgc agt acc gct ctc aga gac atc
 Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile
 370 375 380

act cta tcc aat ggc ctc ttc att ccc aag ggc gag ttg gcc gct gtg
 Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
 385 390 395 400

gct gca gac cgc atg aac aac cct gat gtg tgg gaa aac ccc gaa aat
 Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
 405 410 415

tat gat ccc tac cga ttt atg cgc atg cgc gag gat cca gac aag gcc
 Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
 420 425 430

ttc acc gct caa ttg gag aat acc aac ggt gat cac atc ggc ttc ggc
 Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
 435 440 445

tgg aac cca cgc gct tgt ccc ggg cggt ttc ttc gcc tcg aag gaa atc
 Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
 450 455 460

aag att ctc ctc gct cat ata ctg att cag tat gat gtg aag cct gta
 Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
 465 470 475 480

cca gga gac gat gac aaa tac tac cgt cac gct ttt agc gtt cgt atg
 Pro Gly Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
 485 490 495

cat cca acc aca aag ctc atg gta cgc cggt cgc aac gag gac atc ccg
 His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
 500 505 510

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 Leu Pro His Asp Arg Cys
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<210> 48
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 <212> PRT
 <213> Penicillium citrinum

<400> 48

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Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys
 35 40 45

Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr
 50 55 60

Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro
 65 70 75 80

Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser
 85 90 95

Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe
 100 105 110

Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys
 115 120 125

Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln
 130 135 140

Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala
 145 150 155 160

Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr
 165 170 175

Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr
 180 185 190

Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp
 195 200 205

Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu
 210 215 220

Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro
 225 230 235 240

Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile
 245 250 255

Asp Pro Glu Ile Gln Arg Arg Ala Glu Lys Ala Ala Cys Val Ala
 260 265 270

Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu
 275 280 285

Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala
 290 295 300

Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala
 305 310 315 320

Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln
 325 330 335

Glu Ile Arg Thr Val Ile Gly Glu Gly Trp Thr Pro Ala Ser Leu
 340 345 350

Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
355 360 365

Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile
 370 375 380

Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
385 390 395 400

Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
405 410 415

Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
420 425 430

Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
435 440 445

Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
450 455 460

Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
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Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
485 490 495

500 505 510

Lys Pro His Asp Arg Cys
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aat cag cag cac cct cta cgc tcg gga aat cg_g gca ttg acc tcc aca
Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr
20 25 30 96

ctc caa ttt cta tcc aaa acg gcg tgt cta cac ccg atc cat acc gtt 144
 Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val
 35 40 45

tgc acc ata gct att cta gct agt acc aca tac gtt gga cta ctc aaa 192
 Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys

50

55

60

gac agc ttc ttc cat ggc ccc gca aac gtt gat aaa gca gaa tgg ggc Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly 65 70 75 80	240
tct ttg gtc gaa gga agt cga agc ttg atc acc ggc cca cag aat ggc Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly 85 90 95	288
tgg aag tgg cag agc ttc gac ggg gat gca gat gtt ctc gga gat ttc Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe 100 105 110	336
aac cat caa gca cta atg acc ttg gta ttc ccg ggg tca tat ggg gtt Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val 115 120 125	384
gca tct caa gca gcc tca cca ttc ctt gct ccc ctc cct gtg aac cta Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu 130 135 140	432
tct gtg att gac ctt ccc tca acg tcg agc cct tta acc gcc tat tcg Ser Val Ile Asp Leu Pro Ser Thr Ser Pro Leu Thr Ala Tyr Ser 145 150 155 160	480
aaa gat aaa gtt ttc gcc ttc tct gtg gaa tac agc agc gcg ccg gaa Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu 165 170 175	528
ctc gtg gct gct gtt caa gaa atc ccc aac aac agt gcc gac ctg aaa Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys 180 185 190	576
ttg cag gag acg caa ttg atc gag atg gaa cgc cag atg tgg atc atg Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met 195 200 205	624
aag gct gcc agg gct cac aca aaa cgc agc ctt gct caa tgg gtg cac Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His 210 215 220	672
gat acc tgg aca gag tct ctt gat ctt atc aag agc gct caa acg ctc Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu 225 230 235 240	720
gac gtg gtt gtc atg gtg cta ggt tat ata tca atg cac ttg act ttc Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe 245 250 255	768
gtc tca ctc ttc ctc agc atg aaa aaa ttg gga tcg aag gtt tgg ctg Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu 260 265 270	816
gct aca agc gtc ctt ttg tcg tca aca ttt gcc ttt ctc ctc ggt ctc Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu 275 280 285	864
gac gtg gcc ata aga cta ggg gtt ccg atg agc atg agg ttg cta tcc Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser 290 295 300	912
gaa ggc ctc ccc ttc ttg gtg gtg atc gtt ggc ttt gag aag agc atc Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile 305 310 315 320	960
act ctg acc agg gct gtt ttg tcc tat gct gtg cag cac cga aag ccc Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro 325 330 335	1008

cag aag ata cag tct gac cag ggt agc gtg aca gcc att gct gaa agt Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser 340 345 350	1056
acc atc aat tac gcc gta cga agc gcc att cg ^g gag aag ggt tac aat Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn 355 360 365	1104
atc gtg tgc cac tac gtg gtc gag atc ctg ctc cta gtt atc ggt gct Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala 370 375 380	1152
gtc tta ggc atc caa ggt ggg cta cag cac ttc tgt gtt cta gct gca Val Leu Gly Ile Gln Gly Leu Gln His Phe Cys Val Leu Ala Ala 385 390 395 400	1200
ttg atc ctg ttc ttt gac tgt ctg ctg ttt aca ttc tac act gcg Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala 405 410 415	1248
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cta gag tat cct tcc att cac cgt ggt acc tcg cag cta cac gag tat Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr 565 570 575	1728
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ccc gtc ctc tcc aaa tgg gtg ttt gtg gca ctt gcc cta agt gtc gct Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala 595 600 605	1824
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caa gct cct cag acc aga gtg ttc act cct acc acc acc gac agt gac Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Asp Ser Asp 660 665 670			2016
agt gat gcc tca tta gtc tta att aaa gca tct cta aag gtc act aag Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys 675 680 685			2064
cga gca gaa gga aag aca gcc act agt gaa ctt ccc gtg tct cgc aca Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr 690 695 700			2112
caa atc gaa ctg gac aat ttg ctg aag cag aac aca atc agc gag ttg Gln Ile Glu Leu Asp Asn Leu Lys Gln Asn Thr Ile Ser Glu Leu 705 710 715 720			2160
aac gat gag gat gtc gtt gcc ttg tct ttg cgg gga aag gtt ccc ggg Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly 725 730 735			2208
tat gcc cta gag aag agt ctc aaa gac tgc act cgt gcc gtc aag gtt Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val 740 745 750			2256
cgc cgc tct atc att tcg agg aca ccg gct acc gca gag ctt aca agt Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser 755 760 765			2304
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gtt ggc gtc gcc ggt cct att gtt atc gac ggc aag agt tat ttc att Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile 805 810 815			2448
cct atg gca acc acc gag ggc gtc ctc gtc gct agt gct agc cgt ggc Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly 820 825 830			2496
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gac ggt atg aca cga ggc ccg tgt gtg aag ttt gat gtc ctt gaa cga Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg 850 855 860			2592
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atg aaa gaa gcc ttc aat tca acc agc aga ttt gcg cgc tta caa agt Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser 885 890 895			2688

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cat gca ctg aat gtt atg gcg aca gag gca ggt ttc agc gat atg aat His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn 930 935 940	2832
att att acc cta tca gga aat tac tgt acg gat aag aaa cct tca gct Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala 945 950 955 960	2880
ttg aat tgg atc gat gga cgg ggc aag ggc att gtg gcc gaa gcc atc Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile 965 970 975	2928
ata ccg gcg aac gtt gtc agg gat gtc tta aag agc gat gtg gat agc Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser 980 985 990	2976
atg gtt cag ctc aac ata tcg aaa aat ctg att ggg tcc gct atg gct Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala 995 1000 1005	3024
ggc tca gtt ggc ggc ttc aac gcc caa gct gcc aat ctt gcg gca Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala 1010 1015 1020	3069
gcc att ttc att gcc aca ggt cag gat ccg gcg caa gtt gtg gag Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu 1025 1030 1035	3114
agc gct aac tgc atc act ctc atg aac aat ctt cgc gga tcg ctt Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu 1040 1045 1050	3159
caa atc tct gtc tcc atg ccg tct att gag gtt gga acg ttg ggc Gln Ile Ser Val Ser Met Pro Ser Ile Glu Val Gly Thr Leu Gly 1055 1060 1065	3204
ggg ggt acg att ctg gag ccc cag ggc gca atg ctt gac atg ctt Gly Gly Thr Ile Leu Glu Pro Gln Gly Ala Met Leu Asp Met Leu 1070 1075 1080	3249
ggg gtc cgc gga tca cac ccg acc act ccc ggt gag aat gca cgt Gly Val Arg Gly Ser His Pro Thr Thr Pro Gly Glu Asn Ala Arg 1085 1090 1095	3294
caa ctt gcg cgc atc atc gga agc gct gtt ttg gct ggg gag ctc Gln Leu Ala Arg Ile Ile Gly Ser Ala Val Leu Ala Gly Glu Leu 1100 1105 1110	3339
tcg cta tgt gct gcc cta gcc gcc ggt cac ctg gtc aag gcg cac Ser Leu Cys Ala Ala Leu Ala Ala Gly His Leu Val Lys Ala His 1115 1120 1125	3384
atg gcg cac aac cgt tct gcc ccg gca tct tca gcc cct tct cga Met Ala His Asn Arg Ser Ala Pro Ala Ser Ser Ala Pro Ser Arg 1130 1135 1140	3429
agt gtc tcc ccg tca ggc gga acc agg aca gtc cct gtt cct aac Ser Val Ser Pro Ser Gly Gly Thr Arg Thr Val Pro Val Pro Asn 1145 1150 1155	3474
aat gca ctg agg ccg agt gct gca gct act gat cgg gct cga cgc Asn Ala Leu Arg Pro Ser Ala Ala Ala Thr Asp Arg Ala Arg Arg	3519

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1165

1170

tga

3522

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Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr
20 25 30

Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val
35 40 45

Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys
50 55 60

Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly
65 70 75 80

Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly
85 90 95

Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe
100 105 110

Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val
115 120 125

Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
130 135 140

Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
145 150 155 160

Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu
165 170 175

Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
180 185 190

Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
195 200 205

Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
210 215 220

Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
225 230 235 240

Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe
245 250 255

Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu
260 265 270

Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu
275 280 285

Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser
290 295 300

Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile
305 310 315 320

Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
325 330 335

Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
340 345 350

Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn
355 360 365

Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala
370 375 380

Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala
385 390 395 400

Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala
405 410 415

Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn
420 425 430

Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu
435 440 445

Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu
450 455 460

Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp
465 470 475 480

Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr
485 490 495

Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp
500 505 510

Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe
 515 520 525

Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly
 530 535 540

Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu
 545 550 555 560

Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr
 565 570 575

Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp
 580 585 590

Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala
 595 600 605

Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro
 610 615 620

Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu
 625 630 635 640

Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu
 645 650 655

Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp
 660 665 670

Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys
 675 680 685

Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr
 690 695 700

Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu
 705 710 715 720

Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly
 725 730 735

Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val
 740 745 750

Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser
 755 760 765

Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg
 770 775 780

Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro
 785 790 795 800

Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile
 805 810 815

Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly
 820 825 830

Ser Lys Ala Ile Asn Leu Gly Gly Ala Val Thr Val Leu Thr Gly
 835 840 845

Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg
 850 855 860

Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val
 865 870 875 880

Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser
 885 890 895

Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr
 900 905 910

Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
 915 920 925

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
 930 935 940

Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
 945 950 955 960

Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
 965 970 975

Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
 980 985 990

Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala
 995 1000 1005

Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala
 1010 1015 1020

Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu
 1025 1030 1035

Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu
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Gln Ile Ser Val Ser Met Pro Ser Ile Glu Val Gly Thr Leu Gly
 1055 1060 1065

Gly Gly Thr Ile Leu Glu Pro Gln Gly Ala Met Leu Asp Met Leu
 1070 1075 1080

Gly Val Arg Gly Ser His Pro Thr Thr Pro Gly Glu Asn Ala Arg
 1085 1090 1095

Gln Leu Ala Arg Ile Ile Gly Ser Ala Val Leu Ala Gly Glu Leu
 1100 1105 1110

Ser Leu Cys Ala Ala Leu Ala Ala Gly His Leu Val Lys Ala His
 1115 1120 1125

Met Ala His Asn Arg Ser Ala Pro Ala Ser Ser Ala Pro Ser Arg
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